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BRITISH MAMMALS

VOL. II

BRITISH MAMMALS

WRITTEN AND ILLUSTRATED BY

A. THORBURN, F.Z.S.

WITH 50 PLATES IN COLOUR
AND PEN AND INK SKETCHES IN THE TEXT

IN TWO VOLUMES

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FAMILY **MURIDÆ.**

SUB-FAMILY **Murinæ.**

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THE HARVEST MOUSE.

Mus minutus, Pallas.

PLATE 26.

The Harvest Mouse has several characteristic features which distinguish it from the rest of the genus. It is by far the smallest and also the brightest in colour of our mice, measuring in length of head and body from $2\frac{1}{4}$ to about $2\frac{1}{2}$ inches, the tail being about $2\frac{1}{4}$ inches long. The slim and delicate form, rather blunt nose, short and rounded ears and small eyes, as well as the faculty it possesses of grasping things with the tail, all serve to distinguish this species.

In colour the upper parts are chiefly golden brown, blending into a tawny orange tint about the region of the tail. The under parts are white, with the dividing line well defined.

The young are duller in colour, which is usually described as resembling that of the House Mouse, but one I have seen in early autumn was more or less of a sandy buff.

The Harvest Mouse inhabits the greater part of Continental Europe, but is not known south of the Pyrenees nor farther north than Finland. Eastwards it reaches China and Japan.

We are indebted to Gilbert White of Selborne for the earliest written account of this species in England, as described in a letter to Pennant in November 1767, but Montagu claims to have known it in Wiltshire before its discovery in Hampshire by the Selborne naturalist.

Though the Harvest Mouse is now undoubtedly less plentiful than in former days, perhaps, as has been suggested, on account of the closely cut stubble left by the modern reaping machine, it seems still to be well distributed over the greater part of England, especially in the southern and eastern divisions.

Though I have never succeeded in finding the nest, I consider the species fairly common in the neighbourhood of Godalming, Surrey, having in January 1918 received seven specimens and later in the same winter some others, which had been obtained when corn-stacks were threshed.

In the Midland counties it seems to be rarer, and from Yorkshire northwards it becomes still less frequent, records from the Lake district, Durham, and Northumberland being few and far between.

Across the border in Scotland it has only occurred locally and at rare intervals. MacGillivray recorded it from Aberdeenshire, Midlothian, and Fifeshire, and in the last mentioned county found a nest in a tuft of grass (*aira cæspitosa*). Mr. W. Evans recorded a nest discovered by himself near Aberlady, East Lothian. The Harvest Mouse has also been noted in Berwickshire, Renfrewshire, Ayrshire, Kirkcudbrightshire, and a few other counties at different times.

The question whether it inhabits Wales is uncertain and it is unknown in Ireland.

During the warmer part of the year this species lives amidst the tall vegetation of hedgerows, in reed-beds, or in fields of growing corn, where, woven among the wheat or barley stalks, grass stems, or thistle heads, the

nest may be found, skilfully fashioned of grasses, corn blades, etc. The interior is lined with finely shredded leaves of grasses or other plants.

Gilbert White noted that one found suspended in the head of a thistle in a wheat field was "most artificially platted, and composed of the blades of wheat, perfectly round and about the size of a cricket ball, with the aperture so ingeniously closed that there was no discovering to what part it belonged. It was so complete and well filled that it would roll across the table without being discomposed, though it contained eight little mice that were naked and blind."

The Harvest Mouse breeds several times in the year, producing from five to about eight or nine young at a time.

In England this species usually shelters in corn stacks during winter, but in Holland, according to the late Professor Schlegel, they make their winter nests among reed-beds. These differ from their summer homes, being larger and composed of mosses, and resembling the nest of the Reed Warbler in their attachment to the stems of the plants, not far from the water's level.

The Harvest Mouse is occasionally active and about in winter. I have had one which was caught in a hedgerow near my home in December, and at another time I got a specimen from a stable, which had probably been brought in with some straw.

Though slower in movement and without the power of leaping like the Field Mouse, they are nimble little creatures, and climb among the corn stalks and stems of grasses with an easy action, assisted as they pause in passing from one straw to another by their more or less prehensile tails, which instinctively lapping round a stalk, help to steady the foothold of the animal.

The food consists of corn and seeds of various kinds and also, as has often been observed, of insects. Two of these mice I watched

for some time in captivity were very clever in catching any small flies which entered their cage, when they were promptly seized and eaten.

These mice make interesting and cleanly little pets, and soon get accustomed to captivity.

THE WOOD MOUSE.

Mus sylvaticus, Linnæus.

PLATE 26.

The Wood Mouse, also known as the Field Mouse or Long-tailed Field Mouse, is subject to great variation in size and colour which has led modern naturalists to sub-divide it into many local varieties or sub-species. It is one of the most common and widely distributed of British mammals.

The prevalent form inhabiting our islands (the *Mus sylvaticus intermedius* of Millais) has in general a length in head and body of $3\frac{5}{8}$ inches, with about the same measurement for the tail. The colour of the upper parts is a yellowish brown, brighter on the cheeks and along the lower part of the ribs, and shaded with blackish hairs which are most distinct about the back. The basal portion of the fur is dark slate colour. The under parts are white or greyish white with usually a breast-spot of a buffish tint. The feet are light greyish flesh colour.

The young are always much greyer and duller in colour.

This species is easily distinguished from the Common House Mouse, apart from its brighter colouring, by the large prominent black eyes and much longer ears, hind legs, and tail. In general, the Wood Mouse has also a more thoroughbred look than the other.

THE WOOD MOUSE

Wood Mice, not differing from the typical British form, as well as other races, are found over the greater part of Europe.

Throughout the British islands this species has a widespread distribution, and various local races, showing more or less some difference in size and colour, have been differentiated to such an extent that almost every island off the west coast of Scotland, as well as the Shetlands and Fair Isle, appear to have their own race of Field Mouse.

The Wood Mouse inhabits fields, hedgerows, gardens and woodlands, as well as districts devoid of trees, and even the seashore.

Though nocturnal in habits, it may sometimes be seen by day, and, as like other mice it seems to be short sighted, it may often be watched at close quarters when the observer remains still. Being an excellent climber it obtains much of its food, especially in autumn, among the branches of various hedgerow bushes and trees, such as the hawthorn, wild rose, and others on whose fruit it feeds. Old nests of birds are often used by the mice as platforms or tables on which they place their food, and when these are not conveniently at hand I have seen large collections of the red pulp and empty seeds of hips left on the ground. These are usually nipped off whole and carried to the dining table, though I have noticed the rinds left on the trees with the seeds only removed.

The Wood Mouse is very destructive to crocus and other bulbs in flower beds, and also eats insects and at times even the flesh of its own kind.

The female breeds several times in the year, and produces from about four to six young at a time.

Sometimes the nursery, consisting of a domed nest made of grasses, is placed above ground, but more often it is built inside a burrow. Though this species does not appear to hibernate in winter, it prepares

a snug hiding place for the cold weather. I have known a Wood Mouse to have two winter retreats close together, one made of moss in a thorn hedge, and the other consisting of a burrow in the ground just below.

When disturbed it would leap from its retreat in the bushes and take refuge in the hole underground.

The Wood Mouse is a favourite prey for Owls, Kestrels, Weasels, and other predatory animals.

BRITISH YELLOW-NECKED WOOD MOUSE.

Mus sylvaticus wintoni, Barrett-Hamilton.

PLATE 27.

This handsome variety, first recognised by Mr. De Winton and described by him in 1894, is of large size and bright colouring, with a well marked band of pale yellowish buff across the chest. The centre of this branches upwards and downwards, and forms a kind of cross. An adult male has a total length from nose to tip of tail of $8\frac{3}{4}$ inches, the tail being usually the same length as the head and body combined. The hind feet and legs are very large and strong. The ears are also large and beautifully modelled, suggesting in their delicate outlines the structure of some sea shell.

This mouse is very strong and active, and can leap to a considerable height.

It is common in Surrey, where, as in other districts, it seems to occur more frequently in houses and garden sheds than elsewhere, though owing to its strictly nocturnal habits its presence out of doors may pass unnoticed. Every winter I catch numbers in a loft in my house where

the Common Wood Mouse seldom appears, but I have never known it to enter inhabited rooms. Apples are a great attraction to it in winter.

The figures in the Plate and Tailpiece were drawn from a pair I kept in captivity. From my own experience the chief plunderers of early sown peas are the Common Wood Mouse and not De Winton's.

THE ST. KILDA FIELD MOUSE.

Mus sylvaticus hirtensis, Barrett-Hamilton.

PLATE 27.

This is another very large sub-species, but less brightly coloured than the one last described. The largest of a number of specimens, obtained by Dr. Eagle Clarke on the St. Kilda group of islands in the Autumns of 1910 and 1911, measured in length of head and body 129 millimetres, the tail 100 millimetres, making the total length of the animal from nose to tip of tail about 9 inches. The following is from his description of this fine mouse in the *Scottish Naturalist* (June 1914), "The St. Kilda Field Mouse is confined to the main island Hirta, and to the adjacent uninhabited isles of Soay and Dun. It is most abundant where coarse grass prevails, but is to be found almost everywhere—in the crofted area, in the neighbourhood of the houses, on the faces of the cliffs, and on the sides and hill-tops; finding congenial retreats in the rough stone-built 'cleits' (which are such a feature in the St. Kilda landscape) and in the walls surrounding the crofts". . . . "That the underparts of *hirtensis* are heavily washed with yellowish brown has hitherto been deemed an important characteristic of the species. This is not the case, however, for in the *majority* of adult specimens, and many of the immature ones, the throat, chest, and abdomen are white, and only washed with brown along the narrow medium ventral line. As a result, the demarcation between the peppery reddish-brown upper, and the pale under surface is pronounced in most examples, and renders the species very similar to the familiar Long-tailed Field Mouse (*Apodemus sylvaticus*). About one-third of the adults and the majority of the younger specimens have the under surface more or less strongly washed with yellowish brown."

THE HEBRIDEAN FIELD MOUSE

The figure in the Plate was drawn from one of the specimens obtained by Dr. Eagle Clarke.

THE HEBRIDEAN FIELD MOUSE.

Mus sylvaticus hebridensis, W. E. De Winton.

This variety is larger and more stoutly built than the Common Wood Mouse and has also longer feet and shorter ears.

In colour there is less distinction between the upper and under parts, the latter being duller and strongly suffused with buff, with a patch of this colour on the chest. It appears to be confined to Lewis and Barra, Outer Hebrides, and was first discovered by Mr. J. Steele Elliot and described later by Mr. W. E. De Winton.

THE IRISH WOOD MOUSE.

Mus sylvaticus celticus, Barrett-Hamilton.

This is a small race about the size of *Mus sylvaticus*, with dark upper parts and white on the under side, inhabiting the South and West of Ireland and also the Hebrides and Skye.

THE COMMON MOUSE OR HOUSE MOUSE.

Mus musculus, Linnæus.

PLATE 28.

Smaller than the Wood Mouse, this species is easily distinguished from the other by its dull and more uniform colour, small beady eyes, and shorter ears and tail. The whiskers are also neither so long nor so plentiful.

The head and body of the adult measure about $3\frac{1}{2}$ inches, the tail about $3\frac{1}{4}$ inches.

The colour of the fur in the upper parts is a dusky brownish grey, fading into grey on the sides and belly. The Common Mouse is subject to considerable variation of colour, those living an outdoor life away from houses having usually a more sandy hue than their indoor relations, while black, dark brown, white, or spotted examples are not uncommon. Some local varieties have been noticed on the Scottish Islands, the most distinct being the House Mouse of St. Kilda.

As far as we know the Common Mouse had its origin in Asia, whence it spread into Europe in pre-historic times.

It usually makes a home for itself in dwelling houses and will quietly enter new premises even before the building is completed. Breeding many times in the year and producing half-a-dozen young at a time, it increases enormously under favourable conditions, and like the Brown Rat soon becomes a plague if not kept within bounds. Great damage is done by mice in corn ricks, where they will often collect in hundreds. It is less nocturnal in its habits than the Wood Mouse and will often come out in daylight when in search of attractive food.

THE COMMON MOUSE

The Common Mouse is a good climber and with its power of gnawing soon finds a way into cupboards and storerooms, where it will often make its nest and rear its young. The nest is made of various warm materials, including odds and ends of wool, straw, shreds of paper, etc.

This species seems sensitive to cold, and, like the Wood Mouse, when caught alive in a trap during chilly weather and not quickly removed, will soon become numb and die from exposure.

The most distinctly marked variety of this Mouse in the British Islands is the St. Kilda House Mouse (*mus muralis*, Barrett-Hamilton) whose head and body measure up to $4\frac{3}{8}$ inches and tail nearly $3\frac{5}{8}$ inches. The example shown in Plate 28 was drawn from a specimen obtained along with a number of others by Dr. Eagle Clarke for the Royal Scottish Museum, who describes it as follows in the *Scottish Naturalist* (June 1914), "This is the House Mouse of St. Kilda, and being such is not found out of Hirta—the only inhabited isle of the group. On this island, however, it is not confined to the houses, where it is very abundant, but occurs in the crofts, finding shelter in the walls and cleits. . . .

"In general colour the upper surface of all the adults resembles that of a rather light-coloured example of the ordinary House Mouse; but the coloration of the upper surface presents a remarkable departure from that species, being of a bright buff and clearly separated from the upper surface by a well marked line of demarcation. The hind foot is broader and more robust than in *mus musculus*."

THE BLACK RAT.

Mus rattus, Linnæus.

PLATE 29.

The so-called 'Black' Rat is a smaller and less heavily built animal than the common Brown Rat, and is characterised by its comparatively slender head and body, large shapely ears, and long tail. The measurements are, head and body about $7\frac{1}{2}$ inches, tail about $8\frac{1}{2}$, but individuals vary a good deal in size.

This animal, usually known as the 'Old English Black Rat,' has not been quite happily named, as the colour can hardly be called black and its origin is certainly not English.

Whence it first came appears uncertain but it probably originated, as a more brightly coloured form, in Southern Asia, and travelling westwards by degrees, is supposed to have been brought to Europe in the ships of the Crusaders during the eleventh and twelfth centuries, where it soon established itself and began to attract attention.

The species is not mentioned by the ancient Greek or Roman writers.

In time the colder climate of Europe seems to have changed the originally brighter coloration to a much darker hue.

In England, where this Rat was known as early as the thirteenth century, it was not long in becoming a permanent and unwelcome guest, and continued as the only British species until the coming of the larger Brown Rat (*Mus decumanus*), early in the eighteenth century. The latter, owing to its superior strength, resourceful character, and greater prolificacy, soon ousted the weaker race when they came in contact, until the old Black Rat became scarce and nearly extinct throughout the greater part of the country, except

in some of the seaports. However, this species being by nature well adapted to a life on board ship, has often been able to re-establish itself in small colonies from overseas, as in Yarmouth, where it was found to be numerous by Mr. A. H. Paterson in 1896. Colonies occur in London about the docks, also in Bristol and Sunderland, and it has long been known in the Channel Islands.

The Black Rat was plentiful in Scotland well into the nineteenth century, being common at one time in both the Orkneys and Shetlands.

Compared with the Brown Rat, this species is more active and better adapted for climbing and is said to inhabit by preference the upper parts of houses, while its larger cousins remain below in the drains and cellars.

The Black Rat is less cunning and suspicious than the other. Both have an evil reputation as spreaders of plague and other diseases. The present species breeds several times each year, from seven to nine young being born at a time in a warm nest made of various materials.

Mr. Millais considers there are in the British Islands three well-marked races of the so-called 'Black Rat,' which he names the Alexandrine Rat (figured in Plate 29), the Northern Alexandrine Rat, *i.e.* the misnamed 'Old English Black Rat' (also figured in the Plate), and the Black Alexandrine Rat. The first mentioned he regards "as undoubtedly the true species of which the last named are sub-specific races."

The colour of the upper parts of the Alexandrine Rat is a dull yellowish brown, shaded along the back with long dark hairs; the under parts are yellowish white.

In colour, the 'Old English Black Rat' has the upper parts of a glistering slaty black, the under surface being a leaden grey, while

the Black Alexandrine Rat, described as a recent arrival on our shores, really deserves its name on account of its glossy coat, jet black above and rather lighter below. Mr. Millais informs us that this race "is a native of the Black Sea ports, although its original home is, like that of the other races, unknown. Its habits are similar, and it is a great traveller on board the grain ships, and has doubtless reached many out-of-the-way places of which at present we are ignorant." Differing in colour only, the three forms are identical in shape and habits and will freely interbreed when they come in contact with each other.

THE BROWN RAT

Mus decumanus, Pallas.

PLATE 30.

The Brown or Common Rat, known also as 'Norway Rat' and 'Hanoverian Rat' is too familiar to require much description, and is distinguished from the Black Rat by its stouter form, rounder head and muzzle, smaller ears, and comparatively short and more scaly tail. The whiskers are also less plentiful and not so long.

The colour above is a tawny greyish brown, darkened with numerous black hairs along the ridge of the back, the under parts are dull white. Full grown specimens vary much in size, but they often attain a length of 9 inches in the head and body, and $7\frac{1}{2}$ inches in the tail.

An exceptionally large example examined by Mr. Millais in Sussex had a total length from nose to tip of tail of $19\frac{1}{2}$ inches, and another has been recorded of 23 inches.

The original habitat of this species, like that of the Black Rat, is uncertain, but the more temperate parts of Siberia are considered to have been an ancient nursery of the race.

According to Pallas the species moved westwards in hordes in 1727. Invading Russia and other neighbouring countries, it appeared in England before 1730, where it soon settled down and rapidly increased in numbers, but did not reach Scotland till after 1764.

No other animal is so deservedly unpopular as the Common Rat. Universally hated and with every man's hand against it, it nevertheless contrives to exist and increase in numbers in spite of all

the traps, poison, and other devices invented for its destruction. Whether recent legislation making it compulsory for owners of property to clear their premises of these mischievous creatures, will prove effective or not, remains to be seen.

The annual amount of damage caused by the consumption and spoiling of all kinds of food and stores by Rats is beyond calculation, apart from the destruction caused by their gnawing and burrowing propensities, which enable them to undermine the structure of houses and other buildings.

In a little book entitled *Rats and Mice as the Enemies of Mankind* (2nd ed. 1920), by M. A. C. Hinton, printed by order of the Trustees of the British Museum, an appalling account is given of the loss annually caused in Great Britain by Rats, which is put as high as £15,000,000 by some authorities.

The fleas infesting Rats are the chief cause of the spreading of plague and other diseases, as these insects carry the *bacillus* from the infected animals to man, so the danger to health is quite as serious as the material loss.

Possessed of great cunning and intelligence as well as courage, the old and experienced Rat is seldom outwitted, but the half-grown young will often crowd into a trap when once one has entered.

Though sometimes coming out in the daytime, the Rat is chiefly nocturnal in habits, and, as twilight approaches, may be seen leaving his underground retreat in search of a meal, when nothing edible escapes attention.

He flourishes in large cities as well as on uninhabited islands off our coasts, where he subsists on shell fish or garbage thrown up by the sea.

The female produces several litters in the year, about thirteen or fourteen young being born at a time, which accounts for the rapid increase of the animal.

When asleep, the Rat curls its body into a ball with the forehead placed on the ground and the nose tucked under the chest and between the forepaws.

A dark variety of the Common Rat, entirely black in colour except for a patch of white on the breast, was first observed in Ireland and described by Thompson in 1837, who considered it nearly allied to the Black Rat (*mus rattus*). It has since been shown to be merely a melanistic form of *mus decumanus*, which occurs in the Outer Hebrides and also in various English counties, where it appears to be spreading in increased numbers.

Sub-Family **MICROTINÆ**.

THE BANK VOLE.

Evotomys glareolus, Schreber.

Plate 31

Compared with the true mice, the distinctive character of the Voles lies chiefly in their short and rounded head, small eyes, short ears and tail, and a general stoutness of form caused by the thick and furry coat.

Four species inhabit Great Britain, namely, the Bank Vole, the Field Vole, the Orkney Vole, and the Water Vole, while various sub-species have been noted.

The most mouse-like of this group in character and form is the Bank Vole, which shows considerable variation in size, English specimens being usually rather smaller than those of Scotland.

An adult male taken in Surrey measured from nose to root of tail barely $3\frac{5}{8}$ inches, the tail alone $1\frac{13}{16}$ inches.

The colour of the upper parts in autumn and winter is a dark rusty brown, greyer on the flanks. The cheeks and under parts are grey, but often tinged with pale buff in the centre of the chest and belly. The feet are brownish grey. In summer the russet hue on the back is much brighter.

This species is widely distributed in Europe and Asia.

It was first described in England by Yarrel in 1832 and was soon found to inhabit a wide area in Great Britain. In Scotland it

attracted the attention of MacGillivray before 1838, but for many years it was considered a rather uncommon species in places where it is now known to be plentiful.

As with other Voles, it does not occur in Ireland.

I have found it to be extremely common throughout the year near Godalming in Surrey, where every winter numbers enter my house; these however confine themselves to lofts under the tiles or to outhouses. They are easily trapped, as, like the Wood Mouse, the Bank Vole is very unsuspicious.

Although of nocturnal habits it may often be seen abroad during the day sitting on its haunches while nibbling bulbs and shoots of plants, or creeping among the ivy or withered leaves in hedgerows, which are a favourite resort and often quite undermined by their complicated runs.

I have observed that this species is very fond of flower borders, especially those which are backed by loose stone walls overgrown with plants, where it has a safe retreat at hand in the cracks and openings, and a varied supply of vegetable food among the beds.

The Bank Vole lives chiefly on the seeds and shoots of plants; it is also fond of fruit, especially apples, and will gnaw the tender bark of young trees.

In general its habits are much the same as the Field Vole's, but it is less of a vegetarian and more alert and quick in its actions than the other. It will eat insects, snails, young birds, and other animal food and is also addicted to cannibalism. I have found the partially eaten remains of one in a trap set among apples on a shelf, and soon afterwards caught another of the same species close to what was left of the first.

As an instance of the boldness of this little animal, Mr. A. H. Cocks, writing in the *Field* (January 25th, 1919) describes how he once

witnessed one attacking a young rabbit, about six times the bulk of its aggressor, which had been badly injured by a mowing machine.

A large and brightly coloured form of the Bank Vole, known as the Skomer Vole (*Evotomys hercynicus Skomerensis*, Millais), confined to Skomer Island, off the coast of Pembrokeshire, Wales, and considered by Mr. Millais as only a sub-species, is figured in the tail-piece sketch.

This is considerably larger than the Common Bank Vole, measuring about $4\frac{1}{4}$ inches in length of head and body and about $2\frac{3}{16}$ inches in the tail.

The colour of the upper parts is a fine orange brown, becoming duller and paler on the cheeks and flanks and greyish white tinged with buff on the underparts. The Skomer Vole was first discovered by Mr. Drane of Cardiff when he visited the island of that name in 1897.

At this time, according to Mr. Millais (*Mammals of Great Britain and Ireland*), Mr. Drane "caught several specimens and partially described them in a paper which he read before the Cardiff Naturalists' Society, and which was published in their 'Transactions.'"

Later, in 1906, the Skomer Vole was fully described by the late Major Barrett-Hamilton, who gives it full specific rank.

Mr. Drane observed that the Skomer and Bank Vole are much alike in their general character and habits, and though both frequent the neighbourhood of farmsteads, the former shows a decided preference for such localities, where it may be found in numbers in and around the buildings. Winter stores of turnips are a favourite resort of the Skomer and Bank Vole.

Mr. Drane found that the Skomer Vole bred freely in captivity, five specimens, which soon grew tame, having produced forty-seven young in one season.

A comparatively large race of Bank Vole, possessing rather short ears and tail (*Evotomys alstoni*, Barrett-Hamilton and Hinton), inhabits the Island of Mull, Scotland. Specimens were first taken there by Mr. R. W.

Sheppard in June 1912. In colour the upper parts of this variety are a deep reddish brown, the under parts yellowish.

Another large form (*Evotomys erica*, Barrett-Hamilton and Hinton), closely related to the one inhabiting Mull, has been found among heather on the Island of Raasay, which lies between Skye and the mainland. Describing this vole, Major Barrett-Hamilton says (*A History of British Mammals*, p. 425): "Unlike *E. alstoni*, but in this respect resembling *skomerensis* and *cæsarius*, it has undergone considerable specialisation, apparently to fit it for subsistence upon a coarser and probably more exclusively vegetarian diet." The colour of the upper parts is dark brown, the under parts are strongly tinted with buff.

THE COMMON FIELD VOLE.

Microtus agrestis, Linnæus.

PLATE 31.

This species may be distinguished at a glance from the Bank Vole by its larger and rounder head, blunter muzzle, and by the ears being more or less concealed by the fur. The tail is also much shorter and the colour duller.

The average length of the head and body is about 4 inches, that of the tail about $1\frac{1}{8}$ inches.

The general colour of the upper parts is a greyish brown, the under surface dull white or grey. Some individuals are brighter than others, with a more russet tinge on the back.

There are few cultivated areas in Europe where the Field Vole or closely allied races do not occur, and throughout Great Britain and many of its islands the species is abundant wherever there is sufficient grass land to suit its habits.

In the Orkneys its place is taken by the large Orkney Vole, but the common form, or at least closely related forms, inhabit many of the Hebridean Islands. It is not known in Ireland.

Sociable in its habits, colonies, often consisting of a large number of individuals, are generally to be found among the rough pasturage of meadows or sheep-walks, especially in luxuriant moist localities, as this species is fond of water. In such places their runs may be seen spreading in all directions, either winding among the herbage or tunnelled under the surface of the ground.

From the earliest times in history attention has been directed to the destruction caused to crops and pasturage by these animals, when favourable

conditions have caused their numbers to increase beyond normal bounds, and what is known as a 'Vole plague' or a 'Vole year' occurs.

In such circumstances the animals swarm in masses over agricultural lands like a scourge of locusts, eating every green blade and barking the stems of young trees.

On these occasions, it has usually been noticed how speedily this concentration of animal life attracts the attention of various birds and beasts of prey, such as Owls, Kestrels, Weasels, and Foxes, who decimate the hordes, but hardly account for the sudden disappearance of the plague, which generally happens from natural causes. These are chiefly the failure of the food supply when the fields are eaten bare, and consequent weakness and disease.

In Great Britain 'Vole years' are comparatively rare, but from 1891 to 1893 a great increase of the species occurred in the border lands of Scotland, where many miles of grassland were devastated.

A succession of mild winters seems to be a contributory cause in the abnormal increase of this species, while hard winters with severe frosts help to keep their numbers within bounds.

The Field Vole breeds three or four times in the season, producing from two or three to nine young at a time.

The nest is made of grasses and placed either on the surface or in a hole underground, the situation depending on the time of year. Mr. Millais observed a pair making their nursery and was struck with the rapidity with which they carried out the work.

In the part of Surrey with which I am best acquainted, I find the Field Vole—sometimes called the 'Old Sheep-dog Mouse' from its short tail—to be generally less abundant than the Bank Vole, whose numbers seem less liable to fluctuation, and, owing to the almost exclusively vegetarian tastes of the former, it is seldom tempted by the ordinary bait in mousetraps.

Its favourite food consists of the juicy stems of grasses, but young shoots of heather and various other plants are eaten.

The Field Vole soon becomes tame in captivity, and unlike mice and most other rodents seldom attempts to bite when handled.

THE ORKNEY VOLE.

Microtus orcadensis, Millais.

PLATE 31.

This fine Vole, whose discovery as a distinct species we owe to Mr. Millais, was first described by him in the *Zoologist* (July 1904), though he had observed its distinctive features some years previously.

The maximum size of the species, given by this naturalist in his *Mammals of Great Britain and Ireland*, is: head and body 140 millimetres ($5\frac{1}{2}$ inches), tail 30 millimetres ($1\frac{3}{16}$ inches), the dimensions in very large males being nearly double those of the Common Field Vole.

Some living specimens in Autumn pelage I had an opportunity of examining were in colour a yellowish brown above, with under parts of a yellowish buff. Compared with the mainland Vole, this island species has a rounder head and much blunter muzzle and also a more bushy growth of the fur on the cheeks.

Superficially it has a good deal of resemblance to the Water Vole, but according to Mr. Millais it is more closely related to the Common Field Vole. The majority of the specimens first obtained were from Pomona, the main island of the Orkneys, but the species has been found inhabiting all the larger islands of the group, except Hoy.

It frequents the grass and clover fields on the lower parts of the islands and prefers moist localities. Black varieties of the species are not uncommon.

SUB-GENUS **Arvicola**.

THE WATER VOLE.

Arvicola amphibius, Linnæus.

PLATE 32.

The Water Vole, often called the Water Rat, is the largest of its family, the adults usually measuring about $8\frac{1}{2}$ inches in length of head and body and about $4\frac{1}{2}$ inches in length of tail, though a good deal of variation occurs in the size of different specimens. The form is characterised by its general stoutness, and the tail is proportionally longer than in the other Voles. The ears are short, and sometimes nearly concealed by the long bushy fur.

In colour, the glossy upper parts are greyish brown, often tinged with russet; the under parts are somewhat lighter.

A black variety, first described by MacGillivray, often occurs, chiefly in the more northern parts of Scotland, but also in England, especially in the fen districts of Cambridgeshire and Norfolk. Although subspecific rank has lately been given to this race, the only difference appears to be in the darker colour and rather smaller size. A figure of one is shown in the background of the Plate.

The Water Vole inhabits the greater part of Europe, and is also well distributed over Northern Asia.

It is abundant in places suited to its amphibious tastes over most of England and Scotland, but, like the others of this family, is unknown in Ireland.

Haunting the banks of quiet, weedy streams, ponds, or wide ditches, it is seldom found far from water.

As usual in many of our small rodents it appears to be short-sighted, and consequently may be watched at very close quarters if the observer will only remain still. Under these conditions it is interesting to study its habits. It likes to leave its hiding place in the daytime, when it may often be seen sitting up on its haunches busily brushing and cleansing its coat or engaged in a meal. In habits it is almost entirely vegetarian, chiefly eating the shoots, leaves, and roots of different water plants and also the bark of trees. Turnips and potatoes are sometimes attacked in winter, and acorns too are eaten at this time.

The Water Vole has been accused of taking fish, but if it does so this is not a common habit. As the Common Brown Rat often resorts to the banks of streams for a living, it is not unlikely that the two species are sometimes confused.

If disturbed when sitting by a stream, the Water Vole instantly dives, and swimming under water seeks the entrance of his burrow, which is often below the surface, but there is usually a second outlet leading to the air. When in danger and requiring at the same time to come to the surface to breathe, the Water Vole will cleverly conceal its whereabouts by rising under the cover of floating vegetation or some such protection.

In shallow water one can generally follow with the eye the direction taken, by the cloudy track of mud disturbed by the action of the animal.

A nest of dry grass and other herbage is made for the young either in a burrow or above ground among protecting vegetation, where from four to five are born at a time.

Group or Sub-Order DUPLICIDENTATA

Family **LEPORIDÆ.**

Genus **Lepus.**

THE COMMON HARE.

Lepus europæus, Pallas.

Plate 33.

This species, the largest of British rodents, measures in length of head and body about 22 inches, the tail $3\frac{1}{4}$ inches, and the ears about $4\frac{3}{4}$ inches; the weight of the animal being from seven to ten pounds.

The general colour of the fur is a tawny buff, irregularly broken with darker tints where the blackish under parts of the hairs come into view and relieve the yellow tips.

This want of uniformity in the colour is caused by the peculiar character of the fur, which curls and twists in various directions, especially along the back and upper parts of the animal, where it is thickest.

The neck and shoulders and also the legs are more of a pure yellowish buff. The under parts of the body and tail are pure white, the latter being black on its upper surface.

The ears are a mixture of brown and buff, nearly white behind, and with black tips. In the winter coat the colour is more inclined to grey.

The large and prominent yellowish eyes are so placed that the animal has a good view of anything behind, but sees indistinctly straight ahead.

The hind feet and legs are very strong, and greatly exceed the fore legs in length.

If one examines the tracks of a running Hare or Rabbit in the snow, it will be seen that the hind feet touch the surface well in front of the fore feet, owing to the forward swing of the former when the animal is moving fast.

From ancient times the Hare has always been considered as one of the animals which chew the cud, but the late Mr. Robert Drane of Cardiff, who made a close study of this species in captivity, states (*Trans. Cardiff Naturalists' Society*, vol. xxvii, part ii. 1894-95) that his "own belief is that not only does the Hare never chew the cud, but that he cannot. The Hare has a habit when at rest, as when sitting in its form, of grinding its teeth, probably to keep them in order. May not this be the origin of the assumption that it is chewing the cud?" According to this authority, the food is passed a second time through the body.

The Common Hare is widely distributed over Europe as far north as Scandinavia and Northern Russia and eastwards to the Caucasus. In Great Britain, where it is said to differ slightly from the Continental form, it is plentiful about cultivated ground, especially grasslands, when not driven away by the persecution of man.

This species, though not a native of Ireland, has been introduced there at different times.

It has also been established in the Shetlands, Orkneys and some of the Western Isles of Scotland.

Before the passing of the Ground Game Act in 1880, Hares appear everywhere to have been much more numerous than they are to-day.

As a rule they prefer the lower cultivated lands and grassy downs, but they will often ascend the higher hills, as in Perthshire, where according to Mr. Millais, he has frequently seen and shot them at an altitude of about fifteen hundred feet above Pitlochry.

Except in the breeding season, Hares are usually unsociable in habits, differing in this and in many other ways from Rabbits.

They make no underground burrow, their shelter known as a 'form' being merely a lair to rest in during the daytime, generally situated in the shade in summer or in some sunny spot in winter.

Trusting to their protective colouring, Hares will often sit so tight in their hiding place that they may be almost trodden on.

Towards evening they come forth to feed on the grasses, clover, young corn and the various kinds of herbs which make up their diet. Carrots, turnips, and other vegetables growing in fields and gardens are also attacked, and often in hard winters the bark of young trees is eaten.

The speed at which this animal can travel when hard pressed is astonishing, its highest having been estimated at some thirty miles an hour. If chased it generally runs uphill to gain the benefit of the long hind legs.

The Hare is a good swimmer and will cross wide rivers to get access to some favourite feeding ground or to escape an enemy.

In one of the severe winters about 1880 I once observed a Hare, when chased by a Collie dog, boldly enter the freezing water of the River Tweed. After crossing, at full speed, a broad stretch of ice along the banks, it plunged in where the current kept the water partly clear from ice and where the dog was afraid to follow. Crossing the stream the Hare attempted without success to climb the ice on the farther side, but after struggling for a time, was compelled to return, and I was unable to see what eventually happened as it made for a point lower down the river where it was lost to view.

The Hare produces from two to five young at a time and may breed at any time of the year, though February and March are the usual courting months, when the bucks fight savagely for possession of the does.

The leverets, unlike the young of the Rabbit which are born naked and blind, are well clothed with fur and can see just after birth.

As soon as her family arrives, the mother separates her young, placing them apart in different hiding places where she can visit and suckle them at night.

The Hare has always been highly esteemed for purposes of sport, and in former days was reckoned among the 'five wild beasts of venery,' namely the Hart, the Hind, the Hare, the Boar, and the Wolf.

At one time special sanctuaries appear to have been set apart to encourage the increase and give protection to the Hare. One of these is still in existence near Cheam, Surrey, which is said to date from Tudor times.

My friend Col. Godwin Austin tells me he remembers another still in use in his younger days but now demolished, situated on the top of Merrow Down, Guildford. These sanctuaries consisted of enclosures of several acres encircled by high walls, with convenient holes for the going out and coming in of the animals.

Besides their cry of pain when in distress, Hares have softer notes, used when calling each other or when the mother is suckling her young.

THE MOUNTAIN HARE.

Lepus timidus, Linnæus.

PLATES 34-35.

The Mountain Hare, the *Lepus variabilis* of Pallas, often known as the Alpine, White, Blue, or Varying Hare, is smaller and in general has more the character of the Rabbit than our Common Brown Hare.

The head is rounder, the ears and tail relatively shorter, and the

fur thicker and more woolly in texture. In length the head and body measure about 21½ inches, the tail 2½ inches, and the ears about 3¼ inches. The average weight may be put at 5 or 6 lbs.

In summer the coat is a dusky yellowish brown in colour, changing as the season advances to a bluish grey before assuming the pure white of the full winter pelage.

The under parts and greater portion of the tail are at all times white, while the tips of the ears are always black.

When changing colour these Hares often acquire a patchy or piebald appearance and are then very conspicuous. From the observations of MacGillivray and others, the chief annual moult takes place in spring, but a more or less slight and irregular renewal of the coat may occur at other times of the year. The change of colour generally begins in September, when the brown of summer turns to bluish grey, and gradually bleaching, usually attains its pure winter whiteness by December. Often however some brown remains about the head and ears, while the back is grizzled with darker hairs, as shown in Plate 35. Individuals also differ considerably when renewing their summer coat and frequently retain a good deal of their winter colouring till April.

This species inhabits the northern as well as the mountainous parts of Europe and is also widely distributed in the Arctic regions. A closely related species takes its place in North America.

In the British Islands the chief headquarters of the Mountain Hare are in the Highlands of northern and central Scotland. At one time it appears to have inhabited the Orkneys, though now extinct there, but it exists on some of the Hebridean Islands, where it has been introduced at various times. Its range has lately been extended in many parts of southern and south-western Scotland, mainly by introduction. In Midlothian, it is found on the Pentlands and Moorfoots, among the

Lammermuirs in Berwickshire and on the hilly parts of Peeblesshire, Selkirkshire, Lanarkshire, and Ayrshire.

The Mountain Hare has also been established in some parts of England and Wales. In Ireland it is represented by a sub-species, the Irish Hare.

In character the Mountain Hare differs in many ways from its cousin of the lowlands, being less suspicious and in consequence more easily approached. It shows some affinity to the Rabbit in taking cover from its enemies in holes among the peat or in hiding places under broken rocks.

When undisturbed it may be seen moving to and fro along the slopes of the hills or sitting quietly in the shelter of some rock or peat hag, often looking very conspicuous against dark surroundings in its white winter coat.

When disturbed this species always runs uphill if possible, moving fast at first but soon slackening its pace ; at a distance of some sixty or seventy yards it invariably stops and looks around to reconnoitre before proceeding on its course. These manœuvres are carried on till the animal passes out of sight. The best time to study the Mountain Hare at close quarters is during the breeding season in April, when they may be seen running about in all directions and are at the same time comparatively tame.

Three, four, or five leverets are born at a time, which, like those of the Common Hare, are already clothed with hair at birth. The food consists chiefly of grasses and heather and also at times of moss and lichen.

Apart from man, its chief enemies are the Hill Fox and Golden Eagle who kill large numbers, the latter especially being very destructive.

THE MOUNTAIN HARE

The Mountain Hare does not always keep to his hilly fastnesses, but will often come down to the lower ground in hard weather and occasionally at other times. When it meets the Brown Hare on the lower levels the two species will interbreed.

THE IRISH HARE.

Lepus timidus hibernicus, Yarrell.

PLATE 34.

The Irish Hare closely resembles the Mountain Hare of Scotland and is considered as only a sub-species or variety by Mr. Millais, but the late Major Barrett-Hamilton gives it full specific rank.

The Irish Hare differs from the other chiefly in its greater size and weight, and more distinct reddish brown colour. Owing to the milder climate of Ireland it is also less subject to the usual whitening process in the winter coat, which often retains its darker hue.

This question of seasonal colour was formerly thought to be the chief point of difference between the two animals, but it is now known that the Irish Hare often turns partially and sometimes wholly white in winter, even in specimens introduced into England. A not uncommon buff variety of this Hare is found along the coast of County Dublin and in other parts of Ireland. This variety is also sometimes met with in the Island of Mull, Scotland, where Irish Hares were imported many years ago. Millais says, "In Mull the Hares of Irish blood are fairly numerous; they are larger than the Scotch ones and unlike their cousins *do not become white* in winter."

The Irish Hare is not confined to the mountainous districts of its native country, but occurs also on the low grounds, and in habits does not appear to differ in any way from the Mountain Hares of Scotland.

THE RABBIT OR CONY.

Lepus cuniculus.

PLATE 36.

Compared with the Common Hare, the Rabbit is considerably smaller, the head and body are relatively of stouter build and the ears and legs shorter. The fur is also of a softer texture. The total length from nose to root of tail is about 17 inches, the ears $3\frac{1}{2}$ inches.

The predominating colour of the fur is a grizzled greyish brown, the nape of the neck reddish buff, the under parts of the body and tail pure white. The margins of the ears are dark, and show no black tips as in those of the Hare.

Blaine, in his *Encyclopædia of Rural Sports* (1875), appears to have been the first to draw attention to the more massive head of the buck Rabbit, compared with the slimmer one of the doe.

The weight of a full grown animal is about 3 lbs.

In history the earliest accounts of this species refer to its abundance in Spain and Portugal, as well as in Corsica and the Balearic Islands, where we are told ferrets were used for its capture much as they are to-day. It is also found in the Azores, Madeira, and the Canaries, where it is said to be indigenous.

From the Iberian Peninsula it appears to have spread to France and other parts of the continent of Europe.

According to Barrett-Hamilton (*A History of British Mammals*, p. 184) the supposition that the Rabbit was introduced into Britain by the Romans is without foundation, "as it had no native name in any part of these Kingdoms until the Normans came over and named it."

Dr. Browne, writing in his *Life of Bede*, describes one of the robes—presumably made between 1085 and 1104—and used when the body of St. Cuthbert was removed from Lindisfarne to Durham, as having pictured on the border of the garment a horseman "with hawk in hand and a row of rabbits below."

When once introduced it seems to have spread rapidly in England, where it was valued on account of its skin as well as the flesh. In Scotland it appears to have been at first chiefly confined to the eastern lowlands and some of the islands, and it was long before it reached the Highlands.

According to Mr. J. H. Dixon in his account of the parish of Gairloch, Ross-shire, the Rabbit was quite unknown there till about 1850, when it was introduced at Letterewe. Now it is abundant in all suitable parts of the county.

It is also plentiful in Ireland, where it was brought in in early times.

Rabbits are very sociable in their habits, usually living in colonies, and making comfortable homes for themselves in dark underground burrows, which are often very elaborate in their construction, and are used as a safe retreat during the day. As evening approaches the occupants come out to feed, or to frolic and play, when a Rabbit warren presents a busy scene.

Light sandy soil with plenty of cover is best suited to the habits of this species, but they may be found inhabiting almost any ground not too damp and exposed. In the Highlands of Scotland they usually make their retreats under the shelter of rocks.

The excellence of the turf in Rabbit warrens, owing to the close cropping of the various grasses, is well known. Furze also forms a favourite food, and along the shores of the Moray Firth and elsewhere

the bushes of this plant are so constantly trimmed by the animals' teeth that they assume curious shapes, and often look like foot-stools.

There are few garden flowers or shrubs which escape the Rabbit's attention, especially when freshly planted, as anything newly put in seems always to tempt his appetite.

Mr. J. E. Harting, in his account of the Rabbit ("Fur and Feather Series," p. 6), refers to the difference in the manner of attacking turnips shown by this species compared with the Hare. The latter "will bite off the peel and leave it on the ground; a rabbit will eat peel and all."

When preparing her nursery, the doe generally seeks some situation far removed from the rest of the community. Here she excavates a burrow running several feet under ground, and at the farthest end makes a nest of dry bents or similar material, and lines it with fur from her own belly. From five to eight or nine naked and blind young are born at a time. They are visited and fed by the mother at night, who carefully closes the entrance of the 'stop' or burrow before leaving them in the early morning.

I have seen a doe in broad daylight on a summer morning stealing quietly away from the neighbourhood of her burrow, which she had made in a flower bed not far from my window.

Occasionally Rabbits have been known to produce their young in a nest or form on the ground, after the manner of a Hare.

As a rule the Rabbit is a silent animal, though it will scream loudly when in pain or fear. When suspicious of danger or alarmed they have a way of stamping loudly with their hind feet as a warning to their neighbours, and also make use of their white tails as a danger signal.

When travelling to and fro Rabbits keep to favourite tracks or runs among grass and herbage, and, if these beaten paths are closely examined, they will show that the footsteps are placed at regular intervals and

always more or less on the same spot. This habit is well known to rabbit catchers when setting their snares.

Rabbits have many natural enemies, and chiefly suffer from the attacks of the Fox and Stoat and some of the larger birds of prey.

The so-called Belgian Hare is only a large form of the domestic Rabbit, as the Hare and Rabbit have never been known to interbreed.

Order RUMINANTIA.

FAMILY **CERVIDÆ**. SUB-FAMILY **Cervinæ**.

GENUS **Cervus**.

THE RED DEER.

Cervus elaphus, Linnæus.

PLATE 37 (*Frontispiece*).

This typical species is unquestionably the grandest wild animal we now possess in the British Islands. Like the rest of its family the Red Deer is characterised by the branching antlers peculiar to the male only in all species except the Reindeer, where they are present in both sexes. They are shed every year, and speedily replaced by an entirely new growth. Another distinguishing character in this group is the spotted coat of the young, which in some species is retained by the adults.

The Red Deer or Stag measures about four feet high at the withers, and about six feet from nose to end of tail, but different examples vary a good deal in size. The colour in summer is reddish-brown, greyer on the face and throat, and with a distinct yellowish patch, edged with black, on the hind quarters.

In late autumn and winter the coat is longer and thicker, especially about the neck, and the colour changes to a greyer brown, which often takes a darker hue from contact with peaty ground, where the animal has 'soiled.'

The pale clay-coloured eye gives the stag a curious sinister expression when excited. Below the eye is a cavity known as the 'tear-pit,' containing a yellow waxy secretion.

The antlers are rounded, and when fully developed each usually branches into three 'tines' pointing forwards, with three more points at the top starting from a cup-like depression, but great variation occurs in the number and shape of the points as well as in the size of the horns.

In the first year of a stag's life the growth consists of a single pair of spikes, in the next the brow points are developed, and afterwards the points increase in number till in his sixth year he is usually fully grown, and often has a head of twelve points, when he is known as a 'Royal.'

According to Millais, wild stags in England shed their horns in April, those in Scotland a month later.

Good shelter and abundance of suitable food increase the size and number of points in the antlers, as surely as less favourable conditions, such as poor feeding and overcrowding, cause deterioration.

There are no wild deer in the British Islands to-day approaching in any way the great stags which inhabited our forests far back in pre-historic times, whose wonderful antlers of many points and enormous beam are occasionally dug out of peat deposits or river beds, and dwarf by comparison our best Scottish specimens of modern times.

When the Red Stag casts his horns in spring, the new growth, which increases rapidly, is at first soft, very sensitive, and clothed in a delicate hairy covering known as 'velvet.' When the new horn is complete, this outer covering dries, and as it peels is removed by the action of the animal, who may be seen at this time rubbing his horns against rocks, banks of peat, or trees.

The Red Deer is found inhabiting forest country throughout the greater part of Europe, ranging as far north as Norway, Sweden, and Russia, and southwards to Corsica and Sardinia, but it is now unknown in Greece and Italy.

It also inhabits Asia Minor and North Africa. This species is

indigenous in the British Islands, where in pre-historic times and for long afterwards it was abundant in the vast forests covering the face of the land.

The chase of the Stag formed one of the favourite pastimes of the Norman Kings and their followers, who reserved large tracts of country in which they could indulge in the sport, and where the deer and other wild animals were protected under the cruel forest law.

A few Red Deer still linger in the New Forest, and many more among the moors and woodlands of North Devon and Somerset. Some also remain in Westmorland, besides numerous herds living under semi-feral conditions, or in parks. According to Mr. Millais (*Mammals of Great Britain and Ireland*, vol. iii. p. 109), thirty-one parks and more than seventy hays (small enclosures) are mentioned in Domesday Book as existing at the time, and of these only one remains to-day, namely, Eridge Park (Reredfelle) in Sussex, the property of Lord Abergavenny.

In Scotland, north of the Forth and Clyde, deer forests are numerous, the land under deer having increased enormously since the beginning of the nineteenth century, until at one time the territory given over to these animals stretched almost from sea to sea across parts of northern Scotland.

Since the late war, however, much of this wild country has been utilized for the grazing of sheep.

To those who have been privileged to watch the Red Deer among the glens and hills of Scotland, or to hear his wild and far-reaching notes of defiance as he challenges some rival, nothing else would seem to fit in so well with the spirit of his surroundings as this fine animal, whose form is a model of strength and elegance.

One wonders at his stoutness of heart and untiring muscles as he breasts some hill without a pause with his long swinging stride.

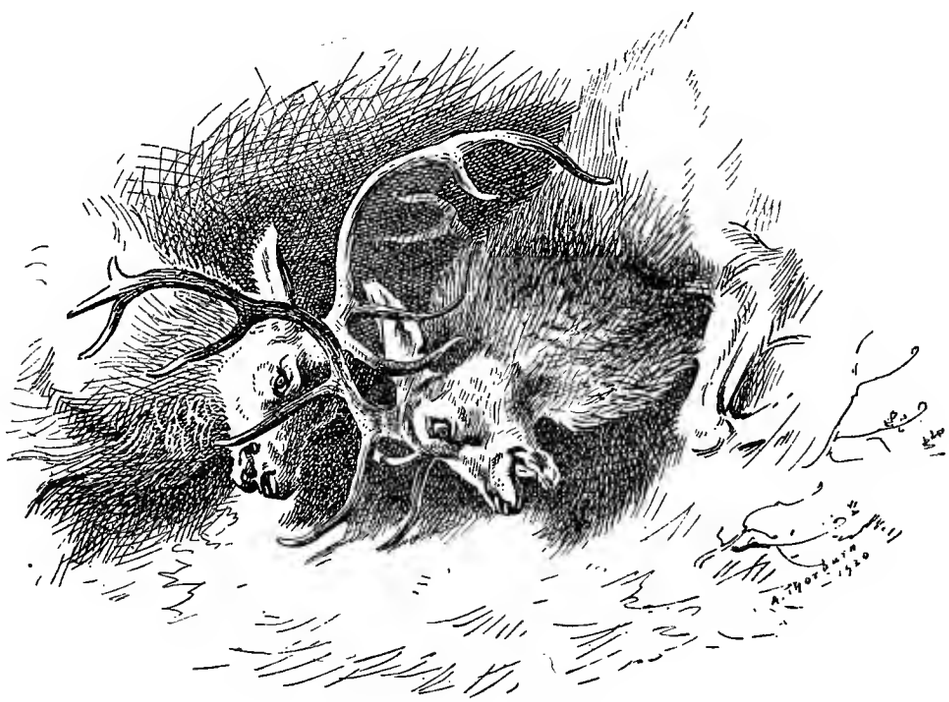
The breeding season begins in October, and after this the sexes separate and keep more or less apart till the following autumn.

Though grass is their principal food, they are fond of the leaves of trees, and do a great deal of damage to crops when near their haunts. A well-known habit of the Red Deer is its partiality for chewing bones and cast-off antlers, which are often found gnawed and worn by the teeth of the animal.

Though timid and shy of human beings when in a wild condition, few animals are more dangerous than a stag which has become sufficiently tame to lose his fear of man, as sometimes happens in the rutting season, when fatal accidents have often happened. Even wild stags when they have taken to plantations near houses, as they sometimes do, and in consequence have lost some of their natural shyness, are not always to be trusted.

The hind brings forth her single calf early in summer, and for some time keeps it hidden in a bed of bracken or other thick cover. The young are marked with spots of white on the back and sides, which are retained till the following spring.

According to Millais, wild stags do not reach their prime till they are eleven years of age, and remain at their best for another four or five years.



THE FALLOW DEER.

Cervus dama, Linnæus.

PLATE 38.

Standing three feet high at the shoulders and measuring from nose to tip of the tail about five feet eight inches, this species differs considerably in form and character from the Red Deer.

The horns of the Fallow Deer have two anterior tines in each, and have no 'bay' tine. The upper part of the beam is flattened out like the palm of a hand, and broken up on the top and behind into several spikes of various length, the lowest, known as the back point, being the longest and most distinct in normal heads.

In many of the New Forest bucks the form of antler differs from that of the ordinary Fallow Deer in parks, and resembles the type found among some of the wild species in Asia, whose horns are much less palmated and more broken up with prongs.

In summer coat, the colour of the Fallow Deer is as a rule of a yellowish russet on the upper parts of the body, boldly spotted with white, with a stripe of the same colour extending along the flanks. The under side of the tail and surrounding parts are conspicuously white, and the belly and inner sides of the legs are also light.

In winter the white spots disappear, and the colour of the body darkens to a greyer brown. This description applies only to the typical Fallow Deer, but in most parks where deer have lived for generations in a semi-domestic condition, various varieties are found, from an almost uniform black hue to pure white. These aberrations in colour are not of recent occurrence, but have been known in England for several centuries,

even before King James I. brought into Scotland the dark race of this Deer.

The Fallow Deer appears to be a native in most of the countries bordering the Mediterranean, including the island of Sardinia, and has been introduced as a park animal into many other parts of Europe. It also occurs in Western Asia and until recently in North Africa.

When or by whom the species was first introduced to the British Islands remains a mystery, but it was probably imported by the Romans during their occupation of the country or by some early traders.

It was certainly plentiful soon after the Norman Conquest, as we know by the writings of the chroniclers.

Chiefly for sporting purposes, herds of Fallow and Red Deer were in early times kept in parks, where they were either hunted with hounds or driven by beaters near enough to the sportsmen of those days to be shot with the bow and arrow. This appears to have been a favourite amusement of Queen Elizabeth and other sovereigns.

Now the park Fallow Deer is usually kept as an ornament, but a remnant of the old stock still inhabit the New Forest and other ancient hunting grounds.

As we see them in parks, Fallow Deer generally associate in herds, and like the Red Deer, the sexes keep apart during a great part of the year. According to Millais, the bucks shed their horns in May and have them renewed and free from velvet in August.

The rutting season begins in October, when the grunting notes of the male are heard and combats take place for possession of the does. Fatal wounds are seldom received in these encounters, as the thrust of a Fallow buck's horn is less deadly than that of the Red Stag, though I have seen a buck which had recently lost his eye.

The doe usually gives birth to a single fawn in the month of June or occasionally at a later time in summer.

In common with other deer, this species likes to browse on the leaves of trees.

The extinct Giant Fallow Deer (*Cervus megaceros*) whose bones have been found in various parts of the British Islands, but chiefly in the peat-bogs of Ireland, was a magnificent animal standing some six or seven feet high at the withers and possessing great palmated horns weighing up to a hundred pounds, and with a span of about ten feet.

GENUS **Capreolus.**

THE ROE DEER.

Capreolus capreolus, Linnæus.

PLATE 39.

Much smaller than either of the preceding species, the Roe stands about 26 inches high at the shoulders, and measures 4 feet from nose to tail.

A full grown buck may weigh over 60 pounds, but the average weight is less.

The striking change in the colour and texture of the coat as the season advances is remarkable. Between May and September or October, the body is lightly clothed with hair of a bright chestnut red, with a white patch on the rump and the muzzle beautifully marked with black and white, as shown in the Plate.

In winter, when the coat becomes very thick and long, it changes to a dark greyish brown or mouse-colour, and the throat is marked with two light patches. The tail is almost concealed by the long hair of the rump.

The Roe buck's horns first appear in his second year as single prongs, in the next season's growth the brow tines are developed, which in turn are succeeded by the complete antlers, each having a brow and two top points. This is the normal head of the roe, but examples occur with a larger number of points, especially in the forests of Germany. The horns are generally cast in November and are renewed and free from velvet by the following April.

An interesting observation has been made by Mr. Millais, that the Roe of Pleistocene times, whose horns are found from time to time in our forest-beds and brick-earth, are, with few exceptions, in no way superior to good modern Scottish heads, while the pre-historic remains of the Red Deer show how vastly superior these animals must have been, compared with those of to-day.

Good Roe horns measure about $9\frac{1}{2}$ inches.

This species inhabits the greater part of Europe, ranging as far north as Sweden and southwards to Italy and Greece. It is also a native of Asia Minor and Northern Asia. Larger forms are found eastwards in Siberia and in the mountains of Manchuria. The Roe was formerly abundant throughout the greater part of England, where it was reckoned among the beasts of chase, but the original stock appears gradually to have become extinct, with the exception of a few which lingered in the northern counties.

They have since been introduced into various parts of the country and now exist in the New Forest, Dorsetshire, Sussex, Surrey, Epping Forest, Cumberland and Northumberland. Roe are not uncommon in the neighbourhood of Godalming, Surrey, where they run wild among the surrounding woodlands. I have seen them on several occasions and even noticed their footprints in my garden. These deer probably strayed at some time from Petworth or Virginia Water.

The Roe has been known from the earliest times in Scotland, and still exists there in large numbers in the northern woods and glens. Their chief stronghold seems to be in Perthshire, and the country about Forres and Beauly, though they are also numerous in many other parts, wherever they can find large tracts of timber with thick undergrowth.

Though the Roe is not indigenous in Ireland some have been introduced there.

These graceful creatures are seldom found far from woods, though they will often leave the seclusion of their cover and come out to the heather of the open moorland in summer. Browsing early in the morning and again in the evening or at night, they pass the greater part of the day hiding in the cover of bracken, brambles, or some other similar protection.

As their sense of smell and hearing, as well as their eyesight, is very acute, they are difficult to see until disturbed, when the conspicuous white patch on their hinder parts is very distinct as they dash aside through the undergrowth.

The Roe is much less sociable in its habits than the Red or Fallow Deer, and is often found alone or in pairs, though many individuals may be scattered about in a favourite stretch of woodland.

Leaves of all kinds, especially those of the Bramble and Ivy, tender shoots of trees and also berries are all favourite food of the Roe. It does a good deal of harm sometimes by nibbling the bark of trees, and in Surrey I have had a small apple tree destroyed in this way.

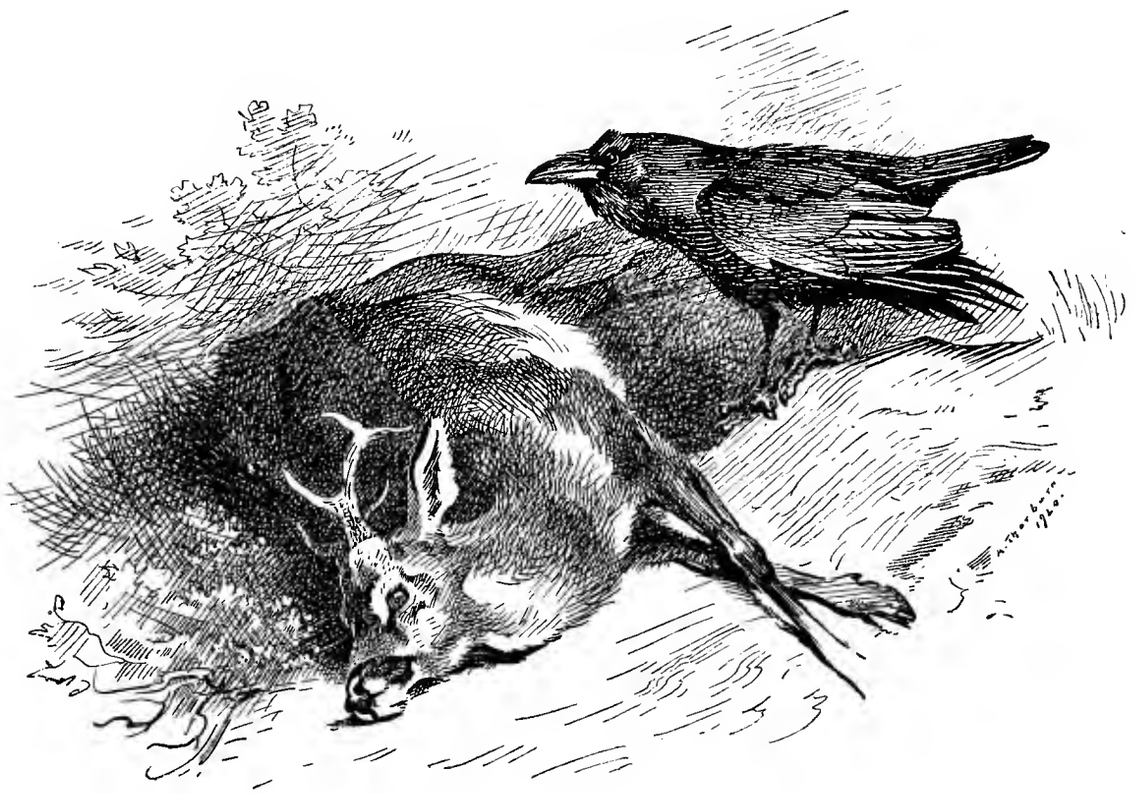
The sexes pair in July and remain in company until the early part of August.

The strange phenomenon in the life history of the Roe, namely, that little apparent development of the unborn young takes place until December, in which month the growth becomes normal, was first investigated by Professor Bischoff and later by Franz Keibel, who have shown that gestation lasts for forty weeks.

At the end of May or beginning of June the doe gives birth to her two fawns, which in colour are dark brown, spotted with yellowish white. The young are early trained by the mother to squat close to the ground and lie hidden in the presence of danger.

The curious circular tracks or runs trodden in the grass by this species in the woods near Cawdor Castle have been described by Mr. Millais in his

British Deer and their Horns. These rings are caused by the constant treading of the animals, as they chase each other when playing among the trees and herbage.



FAMILY **BOVIDÆ.**

GENUS **Bos.**

WILD WHITE CATTLE.

Bos taurus, Linnæus.

PLATES 40-41.

It is difficult to trace with any certainty the origin of the so-called 'Wild' Cattle living under semi-feral conditions to-day, and now considered by most authorities to be descended in all probability from domestic animals which had escaped from captivity at some remote period, and after sheltering for an unknown time in our forests as truly wild creatures, were driven into enclosures in medieval times.

It is therefore a question whether they should be included in a work of this kind, but as the history of the different breeds is of some interest a short account of the principal herds is given.

Mr. Millais considers (*Mammals of Great Britain and Ireland*, vol. iii. p. 188) that "there is a strong probability that the 'Wild' Cattle and all our domestic cattle are descended from breeds produced on the Continent, and that these, after centuries of domestication elsewhere, were introduced into Britain. As far as we can guess, these breeds originally came from the Urus, but at so remote a date that the very earliest history and pictures can give no clue."

An early domesticated Ox, known as *Bos longifrons*, whose bones have been found in large numbers along with the flint implements of ancient Britons, is said to be the origin of our small Welsh and Highland Cattle.

WILD WHITE CATTLE

Though Darwin and other naturalists considered our Park Cattle to be most likely directly descended from the Urus, Professor Owen, Dr. J. A. Smith, E. R. Alston and others do not hold this view, but look upon them as originally a domestic breed, whose wildness has been partly due to their environment.

According to Mr. Harting (*Extinct British Animals*, p. 220) white cattle *with red ears* are referred to in the Welsh laws of Howell Dha about 940 A.D. and wild cattle are mentioned in the forest laws of King Canute (A.D. 1014-1035).

Again they are included among other wild beasts inhabiting the great forests around London by Fitz-Stephen about 1174. In the great Caledonian woods of Central Scotland, pure white forest bulls, with manes like lions, are described by Hector Boece, which may possibly have been the ancestors of the herd which at one time existed at Blair Athole.

As the land became more settled and the forests began to disappear, what were left of the cattle in various parts of Britain were driven into enclosures belonging to the great landed proprietors, where they still remain in one or two localities at the present day.

Perhaps the best known and most famous of the remaining herds is the one at Chillingham Castle, Northumberland, owned by the Earl of Tankerville, where the park extends to about eleven hundred acres. This enclosure is referred to as far back as 1292 as containing wild animals, apparently those which had been driven in from the surrounding district.

In Plate 41 I have shown the head of a Chillingham Bull drawn from life.

In this breed the horns turn upwards and inwards, the inside of the ears and upper part of the muzzle are reddish brown, and the rest of the animal creamy white.

In Mr. Storer's *Wild White Cattle of Great Britain*, pp. 156-157, is given an interesting account of the habits of the Chillingham herd by the late Lord Tankerville, from which the following is quoted, "They have, in the first place, pre-eminently all the characteristics of wild animals, with some peculiarities that are sometimes very curious and amusing.

"They hide their young and feed in the night, basking or sleeping during the day.

"They are fierce when pressed, but generally speaking very timorous, moving off on the appearance of anyone even at a great distance; yet this varies very much in different seasons of the year, and according to the manner in which they are approached. In summer I have been for several weeks at a time without getting a sight of them—they, on the slightest appearance of anyone, retiring into a wood which serves them as a sanctuary. . . .

"It is observable of them, as of red deer, that they have a peculiar faculty of taking advantage of the irregularities of the ground, so that on being disturbed they may traverse the whole park, and yet you hardly get a sight of them."

The Chillingham Cattle have not always been distinguished by their reddish-brown ears, as in 1692 the majority are said to have been black-eared, and when Bewick wrote, a few of this type still existed.

Cadzow Castle, Lanarkshire, owned by the Duke of Hamilton, has another fine herd of White Cattle in the park including part of the ancient Caledonian Forest. This forest was formerly used as a hunting

ground by the Scottish kings and still retained many of its fine old trees when I saw it some years ago.

In this breed the animals have black ears and muzzle, the legs and feet are spotted with the same colour and the horns are rather more spreading than those of the Chillingham herd.

They show a good many wild traits in their habits and are dangerous if approached too closely.

Their appearance is very striking when seen among their wild surroundings of natural forest.

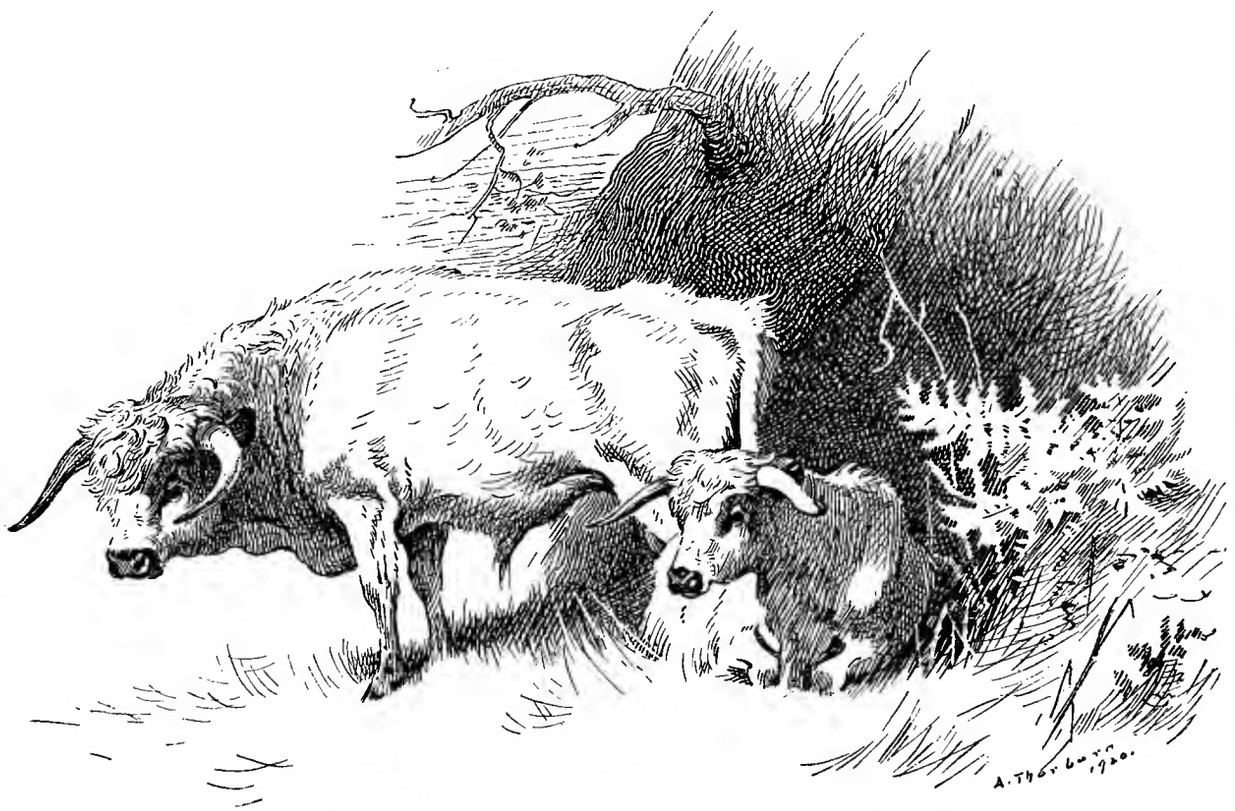
A bull and cow of the breed are shown on Plate 40.

Chartley Park, Staffordshire, was the home of an ancient herd of White Cattle until 1905. I am indebted to the Duke of Bedford for kindly supplying me with the following particulars of this interesting breed at the present time (January 21, 1921): "The Chartley Herd (at Woburn). Owner, The Duke of Bedford, K.G., Woburn Abbey, Bedfordshire. This herd is said to have been driven into Chartley Park from the royal forest of Needwood in the reign of Henry III., where they remained until May 1905, when they were bought by the Duke of Bedford. At that time they only numbered seven, and unfortunately they died without leaving any pure bred progeny. Finding that there was no hope of saving the pure bred stock, their new owner crossed a bull with Longhorn cows. This experiment has proved a success, inasmuch as the constitution and stamina of the herd have been established, and all the characteristics of the old animals preserved. The herd now consists of 5 bulls, 4 steers, 9 cows, 8 heifers and 1 heifer calf."

The type of horn in the Chartley Cattle differs considerably from those of Cadzow and Chillingham, as shown in Plate 41 and in the tail-piece sketch. The ears and muzzle are black.

A few survivors of a polled breed of White Cattle still exist or did till recently, at Blickling Hall, and also at Somerford Park, Cheshire, and some which have been crossed with shorthorns or other breeds, are at Woodbastwick near Norwich, and Vaynol, North Wales.

Many other fine herds of white wild cattle at one time flourishing in various parts of England and Scotland, are now extinct.



Order CETACEA—WHALES, DOLPHINS, AND PORPOISES

Though externally the form of the various species of Whales and Dolphins is fashioned in the likeness of a fish, when we come to examine their internal structure and habits, we find this resemblance is only superficial, and that they are really warm-blooded animals, wonderfully adapted to an aquatic existence, bringing forth and suckling their young like other mammals, and requiring to draw their breath from the atmosphere by rising to the surface at frequent intervals.

To facilitate this movement, the tail is made to act as a powerful propeller, and is characterised by having the flukes or blades arranged horizontally and not in an upright position, as in the tail of a fish.

The well-known spout of a whale is merely the exhausted air driven from the lungs, and being warm and moist has the appearance of a fountain of fine spray as it meets the outer and colder atmosphere, when respiration takes place; but should the animal blow just before reaching the surface, water is driven upwards as well. About half an hour is said to be the length of time a whale can remain under water, though they usually come to the surface at much shorter intervals. The longest stay of a Greenland Whale observed by Scoresby was fifty-six minutes.

The fore limbs or flippers are outwardly formed like paddles, and only capable of movement at the shoulder joint, but hidden within their structure they have an arrangement of bones and muscles not unlike those of the human hand and arm; while the hind legs, represented only by

small rudimentary thigh bones, have no outward development, and are buried deep within the body.

The head, especially in the Whalebone Whales, is large in proportion to the body, and joins the latter without any perceptible neck.

The skin is very smooth and glossy, and covers the layer of fat and tissue known as 'blubber,' which serves instead of a coat of hair to retain the heat of the body.

The larger species, such as the Blue Whale, measuring up to eighty-five feet or more in length, with a girth of forty feet, exceed in their vast size and strength any other animal either of to-day or pre-historic times.

The food of all the Cetacea, except the Killer (*Orca gladiator*), which often preys on other whales or on seals, consists of fish and small crustaceans, the latter being sometimes of minute size.

The pursuit of the Whale in the Middle Ages supported a brave and hardy race of seamen, and while the old methods of capture have changed, and the hand-thrown harpoon is now superseded by a formidable weapon with an explosive charge attached to it, the industry is still carried on with profit.

Following Sir William Flower, the British Cetacea may be divided into two sub-orders, namely, the Baleen or Whalebone Whales (*Mysticoceti*) and the Toothed Whales (*Odontoceti*). The first of these very distinct types includes the Atlantic Right Whale, the Humpbacked Whale, and the four species of Rorqual; the latter, the Sperm Whale, Bottle-nosed Whale, Cuvier's Whale, Sowerby's Whale, True's Whale, Narwhal, White Whale, Killer, Pilot Whale, Risso's Grampus, Porpoise, and the four Dolphins.

The Greenland or Arctic Right Whale (*Balæna mysticetus*), which appears to be confined entirely to the Polar seas, has never been taken

in British waters. This is one of the most valuable of all the species, not only on account of the size and quality of the baleen, but also for the rich supply of oil furnished by the blubber. For this reason it was persistently hunted, after the discovery of its haunts, around the shores of Spitzbergen, first by the English, assisted by Basque harpooners in 1611, and later by other European nations.

Besides being of superior value, the Greenland Whale was easier to capture and kill than its near relation the Atlantic Right Whale of more temperate seas, and this ultimately nearly led to the extinction of the species.

It is worth noting that, although the early whale hunters were well aware of the distinctness of the two species, in later days when the Atlantic Right Whale had almost disappeared in European waters, they were confused and classed as the same animal.

Even William Scoresby, a whaler of great experience, as well as a man of high scientific attainments, who penetrated farther north than any of his predecessors, never met with the more southern species, and did not believe in its existence. His book on the Arctic Regions, published in 1820, gives the best known account of the Greenland Whale fishing, and is full of interesting facts.

The Danish cetologists Eschricht and Reinhardt were the first in modern times to point out the difference between the Greenland and Atlantic Right Whales. The Right Whales were so named because they were the most profitable kind to hunt on account of their valuable baleen and large yield of oil, and they were also less difficult to kill than the Rorquals and others.

Sub-Order MYSTACOCETI—THE WHALEBONE WHALES

FAMILY **BALÆNIDÆ**.

GENUS **Balæna**.

THE ATLANTIC RIGHT WHALE.

Balæna australis, Desmoulins.

PLATE 42.

The Atlantic Right Whale or Nordcaper, known to the French as Sarde, measures over 50 feet when fully grown.

According to Professor D'Arcy Wentworth Thompson, C.B., F.R.S. (*Scottish Naturalist*, Sept. 1918), of sixty-seven specimens captured and brought into the Scottish Whaling Stations during the years from 1908 to 1914, the smallest measured 31 feet and the largest 59 feet, but it is not certain whether these measurements were taken along the curve of the animals' bodies or in a straight line. The average girth of twenty-two specimens was about 32 feet.

Outwardly this Whale chiefly differs from the Greenland Right Whale in having a smaller head, shorter and thicker baleen, while the curved margin of the lower lip follows a different line.

Along the top of the upper jaw, which slopes steeply from where the blow holes are placed in the crown, is a rough horny mass known as the 'bonnet.'

The head is large, measuring about one fourth of the animal's entire length, the body short and thick-set with no dorsal fin, and tapering rapidly towards the tail.

The colour is entirely black.

During the Middle Ages this was a common species in the Bay of Biscay and English Channel, and westwards was plentiful in the Atlantic round the coasts of Newfoundland. Later on, it became increasingly scarce in its old haunts, and towards the middle of last century and for some time later, appeared to be almost extinct. However, between 1889 and 1891 about seventeen were taken by the Norwegian whalers off Iceland, and as already mentioned sixty-seven were captured and brought to the Scottish stations between 1908 and 1914.

Professor D'Arcy Wentworth Thompson has shown in his interesting account of the whales landed at these ports (*Scottish Naturalist*, Sept. 1918, pp. 204-205), that nearly all the Nordcapers were brought into Buneaveneader, having been "caught within a limited area lying to the west and south-west of the Hebrides and beyond St. Kilda, as far as about 10° W. None have been taken on the Rockall grounds and very few in the neighbourhood of the Shetlands." Right Whales, separated from the Atlantic Right Whale by differences so slight as to make them appear identical, inhabit the South Atlantic as well as the North and South Pacific.

The pursuit of the Nordcaper can be traced far back in the Middle Ages, and appears to have been first carried on by the Basques in the Bay of Biscay, along the coasts of France and Spain, when the whale hunters were able to bring in their captures to Bayonne, Biarritz, San Sebastian and other ports.

In course of time, the whales becoming scarce near shore, they were followed across the Atlantic as far as the coast of Newfoundland, where an extensive fishery was carried on.

These Biscayan Whalers were fine intrepid seamen, skilful in the use of the weapon they invented, which still bears the name they gave

it of 'harpoon,' and when the first English seamen under Thomas Edge went north to Spitzbergen in 1611 to hunt the Greenland Whale, they found it necessary to take six Basque harpooners among the crew.

When feeding, the Nordcaper opens its capacious mouth as it proceeds slowly under the surface of the sea, then closing the jaws when the inrush of water has drawn in a multitude of minute crustaceans, it expels the liquid through the baleen blades, while the food remains on the tongue. The amount of nourishment thus taken in must be vast, to supply the needs of such an animal.

The old-fashioned method of hunting the whale with hand-thrown harpoons from boats in touch with a vessel, has now been superseded by an entirely new system, first practised by the Norwegians, when Svend Foyn invented a new weapon in 1864 in order to cope with the dangerous Rorquals. This was a heavy harpoon, with an explosive charge, attached to a strong rope and fired from a gun mounted in the bow of a steamship of moderate size. This method was found to be very efficient.

According to Scoresby a harpoon-gun was in use as far back as 1731, but this was discharged from a small boat at close quarters and was not altogether a success.

In modern whaling, if the animal is not killed by the shock caused by the harpoon, it is soon brought to the surface and killed by being lanced from a boat.

According to Millais (*Mammals of Great Britain and Ireland*), "Right Whales bring forth in the month of March every other year, the young being suckled for twelve months."

For the drawing of this species in the Plate, and for some of the others, I have used the models in the British Museum (Natural History).

FAMILY **BALÆNOPTERIDÆ.**

GENUS **Megaptera.**

THE HUMPBACKED WHALE.

Megaptera boöps, Fabricius.

PLATE 42.

The Humpbacked Whale, the only representative of its genus, is characterised by its stout massive body, low dorsal fin, and extraordinary length of the usually glistering white flippers. In form the latter are narrow, slightly curved, and deeply indented along the outer and part of their inner margins. The throat and chest are grooved with long furrows to allow the necessary expansion of these parts, when the mouth is filled with water containing the small fishes and crustaceans on which the animal lives.

In this species these furrows are set farther apart and are less numerous than in the Rorquals. The baleen is short and black in colour.

About the region of the snout and lower lips are some small knobs or tubercles. In the skeleton the seven vertebræ of the neck are free, and not fused together as in the Right Whales.

The upper parts of the Humpbacked Whale are black in colour, but the under surface varies considerably in different specimens, sometimes this is white, sometimes black, or often a combination of both colours.

There is also a good deal of variation in the colour of the outer side of the flippers, which may be pure white, white varied with irregular

black markings, or black with white patches, but they are always white underneath. In length this species measures from 45 to 50 feet, while the girth is very great in comparison with the length.

The males are usually less than the females.

The Humpback has an extremely wide distribution and visits more or less every part of the Atlantic and Pacific Oceans.

In British waters the majority of the captures of this whale have occurred of late years north of the Shetlands and about St. Kilda.

In character the Humpback is usually bold and fearless and will often allow a close approach by boats and vessels. Mr. Millais describes it as "a gay and sportive animal, frequently springing out of the water and engaging in uncouth gambols."

Sometimes it may be seen lying on its side or rolling over on its back on the surface of the water.

Owing to its great activity and fighting propensities the Humpback is often a dangerous animal to tackle, and it was generally left alone by whalers until the modern method of attack was invented. Even now the successful lancing of this species from a small boat is usually a difficult and dangerous operation.

The females show great affection for their young and will defend them with their lives. The food consists of small fishes, squids, and crustaceans.

GENUS **Balænoptera.**

SIBBALD'S RORQUAL OR BLUE WHALE.

Balænoptera sibbaldii, Gray.

PLATE 43.

The Rorquals, also called Fin Whales, Finbacks or Finners, by whalers, are characterised by their extenuated bodies, rather small and pointed heads, comparatively small flippers, and the large number of longitudinal furrows on the throat and under parts. The dorsal fin is falcated.

The seven vertebræ of the neck are free.

The Blue Whale, as the largest of this group is now usually named, exceeds in size any known animal and measures up to 85 feet and occasionally more in total length.

Millais mentions a monster measuring 102 feet killed by Captain Foden near Derafjord, Iceland, in 1896, and gives the dead weight of the species "at from one hundred and fifty to two hundred tons." The same author gives the colour of an adult bull whose chase and capture he witnessed in August 1905 as follows (*Mammals of Great Britain and Ireland*, vol. iii. p. 250): "The whole of the upper parts were a pale blue-grey, with numerous small brown-grey spots and a few white spots on the neck, shoulders, and flank; tail blue-grey with a white anterior margin; under parts dull brownish grey, being especially dark in the throat and ventral grooves. Pectorals pale bluish grey with the anterior edge white; inner surface and lower convex border pure white; iris pale brown. . . . Tail much spotted with white both above and below."

This example measured 78 feet.

The baleen plates are black.

Formerly considered uncommon, the Blue Whale is now known to be plentiful in the North Atlantic during favourable seasons, and large numbers have been captured since the modern system of whaling began.

According to Professor D'Arcy Wentworth Thompson, C.B., F.R.S. (*Scottish Naturalist*, October 1918, pp. 230-231), about seven hundred and thirty of this species were captured around Iceland between 1890 and 1901 by Captain L. Berg. From 1908 to 1914 one hundred and nine were brought into the Scottish stations. Of the latter, the smallest measured forty-two feet, the largest eighty-five feet, and most of them were caught to the westwards of St. Kilda.

Like the Humpbacked Whale, this species has a very wide range, extending from the Arctic regions throughout the Atlantic and Pacific to the Antarctic seas.

In the summer months large migratory herds appear in the seas about the North Cape and Iceland.

The food of the Blue Whale consists of 'plankton' or 'kril' (masses of small floating crustaceans, etc.) left stranded in the mouth of the animal, after the expulsion of the mouthful of water through the plates of baleen or whalebone.

Owing to its great strength and endurance, this whale was wisely left alone by the early whalers, but since the introduction of the modern harpoon gun, it has been much hunted along with the other Rorquals by the Norwegians.

The marvellous strength and staying power of the Blue Whale can best be realized by those on board ship when the animal takes the vessel in tow, after having been struck by a harpoon and not crippled by the shock of the explosive charge. On occasions, it has been known

to drag a steamship through the water for many hours, with the engines at half-speed astern.

The 'spout' of the animal is described by Mr. Millais as "much loftier than that of any other cetacean," and can be seen on a clear day at a distance of several miles. Three which he saw in August 1905, off Newfoundland, frequently spouted to a height of thirty feet.

Unlike the Right Whales and Sperm, the body of the Blue Whale and other Rorquals sinks after death and requires to be hauled to the surface by the strong hawser attached to the harpoon, worked by a winch on board ship.

To keep the carcase afloat, steam is driven into it through a pipe, and when possible it is taken to a station or factory to be cut up.

The whalebone of the Rorquals is of little value compared to that of the Right Whales, but the oil brings a good price, and various products are now obtained from the bones and flesh, the latter being dried, and ground into meal to feed cattle. Combined with the bones, it is also used as a fertiliser.

Like the others of this family, the female Blue Whale carefully tends her calf, until it is able to fend for itself.

THE COMMON RORQUAL.

Balænoptera musculus, Linnæus.

PLATE 43.

The Common Rorqual, generally called the 'Finner' by whalers, measures when full grown up to 70 and even 80 feet.

The body is remarkably long and slender, with little diminution in the girth of the posterior portion as it approaches the tail, the flippers are small, the dorsal fin prominent and rather triangular in shape.

According to Millais the colour of the upper part "is not black as

usually described, but is always sepia, passing into brownish grey on the flanks. There is great individual variation in this species."

The under parts are chiefly white, the division between the light and dark colour on the belly being sharply defined. The underside of the flippers is always white.

The baleen plates are variegated with slaty grey and cream colour.

The Common Rorqual inhabits the Atlantic and Pacific Oceans, having much the same distribution as the Blue Whale. It is migratory like the others, and in summer frequents the seas of Scandinavia as well as the neighbourhood of Iceland, and of Greenland.

It is by far the most common of the big whales met with in British waters, and appears in large numbers north of the Shetlands, where the chief captures are made. A good many are also taken about St. Kilda.

In the Pacific, it is not uncommon at times off the coast of California, while southwards near the Antarctic circle, numbers are caught by the Norwegian whalers about South Georgia and South Shetland.

On account of its speed and fighting spirit, this species is looked upon by whalers as one of the most dangerous kinds to encounter, especially when it is necessary to lance one from a small boat. Whaling vessels have been sunk by Finbacks charging and knocking a hole in their sides, so it is not surprising that the early whale hunters gave them a wide berth.

Describing the danger in attacking the large Rorquals, Scoresby says (*Arctic Regions*, vol. i. pp. 480-481): "I have made different attempts to capture one of these formidable creatures. In the year 1818, I ordered a chase of them, providing against the danger of having my crew separated from the ship, by appointing a rendezvous on the shore not far distant, and preparing against the loss of much line, by dividing it at 200 fathoms from the harpoon, and affixing a buoy to the end of it. Thus arranged, one of these whales was shot and another struck. The former dived with such

impetuosity that the line was broken by the resistance of the buoy as soon as it was thrown into the water, and the latter was liberated within a minute by the division of the line, occasioned, it was supposed, by its friction against the dorsal fin.

"Both of them escaped. Another physalis (Rorqual) was struck by one of my inexperienced harpooners, who mistook it for a mysticetus. It dived obliquely with such velocity that 480 fathoms of line were withdrawn from the boat in about a minute of time. This whale was also lost by the breaking of the line."

The Common Rorqual feeds on herrings and other fish as well as on crustaceans and squids.

RUDOLPHI'S RORQUAL.

Balænoptera borealis, Lesson.

PLATE 44.

The Sei-Whale (Saithe-Whale), as this species is called by whalers, was first described by the Italian naturalist Rudolphi from a specimen taken in the Baltic in 1819. It is smaller than the Common Rorqual, full grown specimens measuring between 50 and 60 feet in length and occasionally more.

The flippers are relatively short, the dorsal fin high and falcate and placed well forward on the body.

Rudolphi's Rorqual varies considerably in colour.

Mr. Millais says (*Mammals of Great Britain and Ireland*), "The majority are dark sepia suffused with grey like *B. musculus*. The colour of the under surface is grey with large irregular patches of white, the parts about the throat and genital organs white, from thence backwards to the flukes grey."

Collett gives the colour of the upper parts as 'dark blue grey.' It should be borne in mind that the effect of outdoor light gives the smooth shining backs of all these whales a bluish cast. The baleen blades, which are of considerable value as whalebone, are black in colour, with the bristly parts yellowish white.

Little was known about this Rorqual till the Norwegians started their whaling stations about the North Cape in the early 'eighties' of last century, when it was found to be a regular visitor to these northern waters in the summer months.

In 1885 no less than 771 were taken off the coast of Finmark, and large catches have been obtained in recent years in the neighbourhood of St. Kilda and north of the Shetlands. From May till August it appears to be common in some seasons in these northern waters, but according to Flower and Lydekker it has not been found south of Biarritz.

Westwards it is plentiful at times on the coasts of Newfoundland and Labrador.

In habits this species does not appear to differ much from the other Rorquals, but it may be distinguished when at the surface of the water by the fairly large falcate dorsal fin.

According to Collett, its food consists of small crustaceans.

THE LESSER RORQUAL.

Balænoptera acuto-rostrata, Lacépède.

PLATE 44.

The Lesser Rorqual, also known as the Pike-whale, is distinguished from the rest of the *Balænoptera* by its much smaller size and also by the white band across the upper side of the flippers. It measures

up to about 30 feet in length, is somewhat stout in build and like Rudolphi's Rorqual possesses a rather high and hooked dorsal fin.

The colour above is greyish black or brownish grey, the ribbed under parts are white and the baleen yellowish white.

This whale is a northern species, approaching in summer the ice floes of the Polar regions, when it also visits the fjords of Norway, the Shetlands, and the coasts of Scotland.

It has more often been stranded on the shores of Scotland than those of England.

In the *Report on Cetacea Stranded on the British Coasts during* 1916, by Sir Sidney Harmer, F.R.S., two Lesser Rorquals are reported stranded on the Scottish Coasts, one at North Berwick in August and another at Caithness in October. The first of these had lost its head, tail, and flippers.

The habits of this species are not known to differ from those of its congeners, and owing to its small size it is not considered of much value by the whalers.

Sub-Order ODONTOCETI—TOOTHED WHALES

FAMILY **PHYSETERIDÆ**.

GENUS **Physeter**.

THE SPERM WHALE OR CACHALOT.

Physeter macrocephalus, Linnæus.

PLATE 45.

The various members of this group (*Odontoceti*) are distinguished by the possession of teeth, which may be numerous in both upper and lower jaws, or confined to a single pair in the latter; there is also no whalebone. The nostrils are united below the surface and form one external blowhole. The skull is not symmetrical.

The Sperm, by far the largest of these toothed whales, measures up to and over 60 feet, the females being considerably less. The huge head, appearing as if cut off abruptly in front, and taking up about one third of the whole length of the body, is curiously shaped, the massive upper part being adapted as a sort of well or receptacle to contain the valuable oily fluid known as spermaceti. The blowhole is placed very far forward on the left-hand side and near the extremity of the head. The first vertebra of the neck is free, the others united.

The upper jaw reaches considerably beyond the lower.

One or more rounded protuberances on the back represent the dorsal fin.

The flippers are broad and unpointed. In the lower jaw are from twenty to twenty-five pairs of hooked teeth, those in the upper jaw being rudimentary and buried in the gum.

In colour, the upper parts of this whale are black or greyish black, the under parts much lighter and greyer.

The blubber of the Cachalot, as the Sperm Whale is frequently called, furnishes the valuable sperm oil of commerce, and the great reservoir in the head or 'case,' contains the spermaceti. The latter is a clear oily liquid which can be bailed out while warm, but afterwards hardens to a white waxy substance.

Another valuable product of this animal is Ambergris, a secretion found in its stomach or sometimes floating in the water. Mr. W. G. Burn Murdoch (*Modern Whaling and Bear Hunting*, p. 314) describes it as "a solid fatty substance of a marbled grey-and-black appearance, and generally contains the beaks of cuttle-fish, which form the principal food of the Cachalot or Sperm Whale. When fresh it has an intolerable smell, but after exposure this goes and leaves what some people call a 'peculiar sweet earthy odour.'"

Ambergris is used as a basis in the manufacture of perfumes and brings a great price, as much as twenty-five shillings an ounce.

The Sperm Whale has a wide distribution throughout the warmer waters of the world, inhabiting the Pacific, Indian, and Atlantic oceans and travelling in large bands or 'schools.'

From time to time it gets stranded on the coasts of the British Islands.

One of the earliest recorded is that by Sir Thomas Browne, who mentions a 'spermaceti whale' stranded at Hunstanton, Norfolk, early in the seventeenth century. An earlier record, which seems to refer to this species, may be found in Sir R. Baker's *Chronicle*, published in 1650. In this the statement is made that "In her seventeenth year (*Queen Elizabeth's*, 1575) a vast mighty whale was cast upon the Isle of Thanet in Kent twenty ells long, and thirteen foot broad from the belly to the

back-bone, and eleven foot between the eyes. . . . The oil being boyled out of his head was *Parmacittee*."

The first recorded Scottish example was taken at Limekilns, Firth of Forth, in 1689.

Most of the captures of Sperm Whales on our side of the Atlantic have occurred in recent years about St. Kilda and Rockall, where, according to Professor D'Arcy Wentworth Thompson (*Scottish Naturalist*, Oct. 1918, p. 222), forty-two were taken during the years 1908-1914, all being males except one.

Thomas Beale, in his work on the Natural History of the Sperm Whale, as quoted by Millais, describes it as "moving through the water with the greatest ease, and with considerable velocity. When undisturbed, he passes tranquilly along just below the surface of the water at the rate of about three or four miles an hour, which motion he effects by a gentle oblique motion from side to side of the flukes, precisely in the same manner as a boat is sculled by means of an oar over the stern. When proceeding at this, his common rate, his body lies horizontally, his hump projecting above the surface, with the water a little disturbed around it, and more or less so according to his velocity ; this disturbed water is called by whalers 'white water,' and from the greater or less quantity of it an experienced whaler can judge very accurately of the rate at which a whale is going from a distance of even four or five miles.

"In this mode of swimming the whale is able to attain a velocity of about seven miles an hour, but when desirous of proceeding at a greater rate the action of the tail is materially altered ; instead of being moved laterally and obliquely, it strikes the water with the broad flat surface of the flukes in a direct manner, upwards and downwards ; and each time the blow is made with the inferior surface, the head of the whale sinks down to the depth of eight or ten feet, but when the blow is reversed it rises out

of the water, presenting then to it only the sharp cutwater-like inferior portion."

Describing the spout of this species, Millais says : " After an absence under water of from twenty minutes to one hour, the Sperm Whale rises to blow. The form of the spout is different, both in the form and in the angle at which it is projected, from that of any other Cetacean. The column of vapour lasts about three seconds, and is shot out from the blowhole at an angle of 35° for a distance of 15 to 20 feet, the spray falling like a fountain, but if any wind is blowing it appears ' bushy.' " Owing to the forward position of the nostril the spout is projected from the extremity of the snout.

The Sperm Whale is polygamous, and while the strongest bulls take possession of the cows, the younger males are driven out and roam the seas in herds.

According to the late Frank Bullen, the female Cachalot shows less consideration for her young than the other large Whales, and will desert it when attacked.

Before the introduction of the modern method of capture, the Sperm was considered a dangerous whale to harpoon, as when defending itself it used its powerful jaws as well as the great tail flukes, which often caused fatal accidents in this pursuit. The food consists chiefly of squids, including some of great size, and also of various fishes.

GENUS **Hyperoödon.**

THE BOTTLE-NOSED WHALE.

Hyperoödon rostratum, Müller.

PLATES 44-45.

This species possesses a single pair of teeth, which are hidden in the gum at the point of the lower mandible, and are invisible in the living animal.

The snout is lengthened in the form of a pronounced beak; above this the frontal part of the head rises, in the old males almost perpendicularly, but in the females and young with a more sloping outline. The adult males attain a length of 30 feet, the females about 24 feet.

The bones of the neck are united. The flippers and dorsal fin are small, the latter being placed far back.

The drawing of the head of this Whale (Plate 44) taken from a cast in the British Museum (Natural History) shows one of the gular grooves, a pair of which run along the lower jaw.

The Bottle-nosed Whale shows great variation in its colour.

According to Captain D. Gray (*Proceedings of the Zoological Society for* 1882), "They vary in colour from black in the young to light brown in the older animals. The very old turn almost yellow, the beak and front part of the head being nearly white, with a white band round their necks; all of them are greyish white on the belly."

The species is found in considerable numbers in the North Atlantic, and it penetrates as far as the margin of the ice in the Arctic seas.

It is abundant in the waters on both the western and eastern sides of Greenland, from thence across to Spitzbergen, Iceland, and the British Islands, where it has often been found cast on our coasts.

The food is said to consist chiefly of cuttlefish. Captain D. Gray, in his account of this species referred to above, describes its food as "a bluish white cuttlefish, six inches long by three inches in circumference, and pointed towards the tail."

On account of the value of its oil and spermaceti, the Bottle-nose has been much hunted, though it appears to be one of the most dangerous of whales to harpoon from a boat, because of the sudden downward rush which the animal makes when struck, and unless great attention is given to the line, men are liable to get entangled and swept overboard. Many accidents have happened in this way. There is also the danger of the whole boat and its crew being dragged under should any hitch occur and the line not instantly cut.

The Bottle-nose is sociable in its habits, moving about in small parties or 'schools.'

According to Captain D. Gray's above mentioned account, "They are very unsuspicious, coming close alongside the ship, round about underneath the boats, until their curiosity is satisfied. . . . They can leap many feet out of the water, even having time while in the air to turn round their heads and look about them, taking the water head first, and not falling into it sideways like the larger whales."

GENUS **Ziphius.**

CUVIER'S WHALE.

Ziphius cavirostris.

PLATE 46.

This rare beaked Whale, the only known species of the genus *Ziphius*, is distinguished by the single pair of pointed teeth inclining forwards at the extreme end of the lower jaw. In the skeleton, only the first three vertebræ of the neck are joined, the others being free. Until recently very little was known of the appearance and colour of Cuvier's Whale. It was first described by the scientist whose name it bears from a skull obtained on the coast of Southern France, and a few more examples have been obtained at long intervals in the Mediterranean and one in Sweden.

The first British specimen was captured off Hamna Voe, Shetland, in 1870, whose skull on being sent to Edinburgh was identified by Sir William Turner.

On July 18th, 1915, a good example of a male Cuvier's Whale came ashore at Fethard, Co. Wexford, Ireland, and, thanks to a recent Government regulation whereby any whale stranded on our coasts is immediately reported by the coastguard to the authorities at the British Museum of Natural History, an exact model of the specimen was able to be made on the spot, and the colours and measurements noted by Mr. Bishop.

This whale measured 18 feet $2\frac{1}{2}$ inches in total length. In colour the area from the chin to the base of dorsal fin was greenish white, the rest of the body slaty black. As usual in whales whose food consists

chiefly of squids, the flanks of the animal were marked with various lines and scratches caused by the tentacles of these creatures. In life the colour of the light parts of the head and shoulders was probably a purer white, as Mr. W. P. Pycraft, to whom I am indebted for many useful notes on the cetaceans, tells me that he once observed two Cuvier's Whales in the sea off the Wexford coast, and while watching them from above was struck with the shining whiteness of the head and shoulders as the animals moved through the clear water. According to Sir Sidney Harmer's *Report on Cetacea Stranded on the British Coasts during* 1916, an example of this species occurred on the Cornish coast on June 7th of that year.

Cuvier's Whale has an extremely wide distribution, roving from the British coasts and those of the Mediterranean through the Atlantic, Indian, and Pacific Oceans to New Zealand, where it has been obtained on several occasions. A young New Zealand *Ziphius*, described by Messrs. Scott and Parker in the *Transactions of the Zoological Society*, vol. xii., was coloured brown on the sides of the head and purple black on the back. The drawing in the Plate was made from the model in the British Museum (Natural History).

GENUS **Mesoplodon.**

SOWERBY'S WHALE.

Mesoplodon bidens, Sowerby.

PLATE 46.

In this genus, comprising several species—only two of which are British—the snout is elongated in the form of a beak, and in Sowerby's Whale the adult male is characterised by a single pair of pointed teeth placed rather far back in the lower mandible towards the middle of the jaw, while in True's Beaked Whale they are situated at the extremity of the lower mandible. Sowerby's Whale measures from 15 to 18 feet in length, and in colour is usually a bluish black all over the body, with many criss-cross lines and scratches on its surface, caused by the tentacles of cuttlefish.

The following is the description of the colour in a female specimen stranded on the Norfolk coast at Overstrand, near Cromer, in December 1892, by the late Thomas Southwell and Dr. Harmer—now Sir Sidney Harmer—in the *Annals and Magazine of Natural History* (ser. 6, vol. xi., April 1893): "Previous observers have described this animal as being lighter beneath than above. This was distinctly not the case in the specimen under consideration, which was of a uniform black colour (with the slight exception shortly to be mentioned), the skin being very smooth and polished, as has been described in other instances; and the fishermen in charge who had assisted in its capture informed us that there was a perceptible bluish tint on the skin in a good light.

SOWERBY'S WHALE

"But the most remarkable feature was the presence of a number of curiously shaped marks sparsely distributed over the body, but most conspicuous on the side and ventral surface. These spots were most irregular in size and figure, others mere blotches, others again having the appearance of splashes or smears varying in size up to that of a man's hand."

The first example of Sowerby's Whale known to naturalists, which was described by Sowerby, was obtained on the shores of the Moray Firth near Nairn in 1800.

Since that date others have come ashore from time to time, mostly in Scotland, and the latest I know of is one obtained on the Lincolnshire coast mentioned in Sir Sidney Harmer's *Report on Cetacea Stranded on the British Coasts during* 1916.

The knowledge of the distribution of Sowerby's Whale is meagre. It has been taken on the coasts of Scandinavia, whence it ranges as far as Australia and New Zealand in the Pacific.

TRUE'S BEAKED WHALE.

Mesoplodon mirus.

An example of this very rare beaked whale—first described by the late W. F. True in 1913 (True, 1913, *Proc. U.S. Nat. Mus.*, xlv. pl. 51), from a specimen taken at Beaufort Harbour, North Carolina—was obtained at Liscannor, County Clare, Ireland, on June 9th, 1917. Another is said to have been stranded in Galway Bay about 1899.

This species appears to be closely related to Sowerby's Whale, but the characteristic pair of teeth in True's Beaked Whale are placed at the point of the lower jaw as in Cuvier's Whale.

I am indebted to Mr. W. P. Pycraft for the above mentioned particulars.

FAMILY **DELPHINIDÆ.**

GENUS **Monodon.**

THE NARWHAL.

Monodon monoceros, Linnæus.

PLATE 47.

The members of this family (*Delphinidæ*) are characterised by usually possessing a number of teeth in both jaws.

As a rule the different species are much smaller than in the Physeteridæ, though the Killer attains a length of about thirty feet. The blowhole takes the form of a crescent, with the points directed forwards.

The Narwhal or 'Unicorn' of the whalers, attains a length of from 13 to 16 feet, excluding the tusk, and its widest circumference is 8 to 9 feet, according to Scoresby. The tusk or 'horn,' peculiar to the male, tapers to a blunt point and has a spiral twist from left to right. It measures from 5 to 8 feet in length, and has its origin on the lower part of the left hand side of the upper jaw. The right hand tusk is usually rudimentary and concealed in the jaw.

In the female the tusk is undeveloped, but both sexes have also some rudimentary teeth.

On rare occasions a pair of tusks are developed in the male.

Scoresby gives the following description of the species (*Arctic Regions*, vol. i. pp. 487-494): "The head is about one-seventh of the whole length of the animal; it is small, blunt, round, and of a paraboloidal form. The mouth is small and not capable of much extension. The under lip is wedge-

shaped. The eyes are small, the largest diameter being only an inch, and are placed in a line with the opening of the mouth, about 13 inches from the snout. The blowhole, which is directly over the eyes, is a single opening, of a semi-circular form, about $3\frac{1}{2}$ inches in diameter or breadth, and $1\frac{1}{2}$ radius or length.

"The fins, which are 12 or 14 inches long and 6 or 8 broad, are placed one-fifth of the length of the animal from the snout. The tail is from 15 to 20 inches long, and 3 to 4 feet broad. It has no dorsal fin, but in place of it is an irregular sharpish fatty ridge, two inches in height, extending two and a half feet along the back, nearly midway between the snout and the tail. The edge of this ridge is generally rough, and the cuticle and rete mucosum being partly wanting upon it, appear to be worn off by rubbing against the ice.

"The prevailing colour of the young Narwhal is blackish-grey on the back, variegated with numerous darker spots running into one another, and forming a dusky black surface, paler and more open spots of grey on a white ground at the sides, disappearing altogether about the middle of the belly. In the elder animals the ground is wholly white or yellowish-white, with dark-grey or blackish spots of different degrees of intensity. These spots are of a roundish or oblong form: on the back, where they seldom exceed two inches in diameter, they are the darkest and most crowded together, yet with intervals of pure white among them. On the sides, the spots are fainter, smaller, and more open. On the belly, they become extremely faint and few, and in considerable surfaces are not to be seen.

"On the upper part of the neck, just behind the blowhole, is often a close patch of brownish-black without any white.

"The external part of the fins is also generally black at the edges, but greyish about the middle. The upper side of the tail is also blackish round the edges, but in the middle, grey, with black curvilinear streaks on a white

ground, forming semi-circular figures on each lobe. . . . The colour of the sucklings is almost wholly a bluish-grey or slate-colour. . . .

"The principal food of the Narwhal seems to be molluscous animals. In the stomachs of several that I have examined were numerous remains of sepiæ.

"Narwhals are quick, active, inoffensive animals. They swim with considerable velocity. When respiring at the surface, they frequently lie motionless for several minutes, with their backs and heads just appearing above water. They are of a somewhat gregarious disposition, often appearing in numerous little herds of half a dozen, or more, together. Each herd is most frequently composed of animals of the same sex."

According to Mr. W. G. Burn Murdoch (*Modern Whaling and Bear Hunting*, p. 237) Narwhals utter at times a groaning sound.

This species keeps chiefly to the ice in the Arctic seas, and only on very rare occasions has visited the British coasts.

The first is recorded from the Firth of Forth, where one was taken near the Isle of May as far back as 1648. The next was stranded alive near Boston, Lincolnshire, in 1800, and another was driven ashore in Weisdale Sound, Shetland, in September 1808.

GENUS **Delphinapterus.**

THE WHITE WHALE OR BELUGA.

Delphinapterus leucas, Pallas.

PLATE 47.

This other Arctic species, nearly related to the Narwhal, measures from 12 to 20 feet in length. The forehead is full and rounded. The jaws contain from eight to ten teeth on each side. There is no back fin, but its place is occupied by a low ridge. The skin is smooth, in colour a glossy yellowish white in the adult, in the young a dark mottled grey.

The White Whale inhabits the waters of the circumpolar region, ranging as far north as 81° 35′, according to Greely. It is abundant north of Iceland and about Spitzbergen, and also frequents the mouths of the great rivers of Northern Siberia. From the Seas around Greenland it ranges on the American side to Labrador, the river St. Lawrence and Alaska. This Whale only occasionally visits the British Islands. Two immature examples are said to have been stranded in the Pentland Firth, west of Thurso, in 1793. Another which had previously been noticed for three months in the Firth of Forth, was killed by some fishermen in June 1815. The occurrence of one was recorded in the Island of Auskerry, Orkneys, in October 1845 (Bell).

Alston mentions one seen in Loch Etive in June 1878, and according to Millais another was caught by the flukes of the tail between the two posts of a stake net near the little Ferry, Sutherland, in 1879.

Harvie-Brown and Buckley mention one seen in the Kyle of Tongue in August 1880, and another was taken at Dunbeath, Caithness, in 1884 (Millais).

The White Whale has seldom occurred in England. Millais mentions the capture of two, the first at the mouth of the Tyne, June 1903, and one shot at Moreby on the Yorkshire Ouse.

This species is gregarious and is very lively and playful in its actions, often coming to the surface of the water where it will roll and gambol in the neighbourhood of vessels. Captain Scammon says (*Marine Mammalia and American Whale Fishery*, p. 93): "When undulating along in this manner, it often makes a noise at the moment of coming to the surface to respire which may be likened to the faint lowing of an ox, but the strain is not so prolonged."

The White Whale has several times been kept in confinement. Bell mentions one which lived for two years in a tank in America, and two were exhibited at different times at the Westminster Aquarium; these however only lived for a short time.

The skin is of considerable value, being manufactured into the 'porpoise leather' used for boots.

For this reason large numbers are annually killed by the Norwegian Whalers.

The Esquimaux also hunt them for their blubber and flesh.

THE COMMON PORPOISE

GENUS **Phocæna.**

THE COMMON PORPOISE.

Phocæna communis, Cuvier.

PLATE 49.

The Common Porpoise, the smallest and most abundant of British Cetaceans, usually measures from 4 to 5 feet and occasionally more in length. The head is rounded and has no external beak. Each jaw is furnished with about 25 teeth, which are spade-shaped and not conical as in many of this group. The triangular dorsal fin is placed about the middle of the back.

The colour of the upper parts is a glossy greyish black, which is more or less blended into the white of the throat and belly. The Porpoise is a common species on both sides of the Atlantic, keeping mostly near the coasts. It is abundant all round the British shores and the Atlantic Coasts of France as well as those of Northern Europe, but rarely occurs in the Mediterranean. It goes as far north as Baffin's Bay and southwards to the North American coast.

The Porpoise is also found in the Pacific on the western side of America.

These animals are very sociable, moving about in 'schools,' when their black triangular dorsal fins and backs may often be seen above the surface of the water as they follow and play around a vessel at sea, or swim with an easy-going rolling motion among the waters close inshore.

In their playful moods, they will leap quite clear of the sea, as shown in the Plate. They seem to have no dislike to fresh water and will ascend rivers like the Thames where they have been seen well above London Bridge.

The Porpoise lives chiefly on fish, including grilse, mackerel, herring, pilchard, and others, and will often follow the shoals as they approach the coast.

At one time its flesh was popular as an article of food.

GENUS **Orca.**

THE KILLER OR GRAMPUS.

Orca gladiator, Gray.

PLATE 48.

In this large species, the adult male attains a length of about thirty feet, the female being considerably less. The head is broad and rounded, the jaws contain about twelve pairs of formidable curved teeth, and the whole body is very robust. The most striking feature in this whale is the enormous development of the flippers and dorsal fin in some of the old males. In Sir Sidney Harmer's *Report on Cetaceans Stranded on the British Coasts during* 1916, mention is made of one found in the Solway Firth whose dorsal fin measured no less than 5 feet 6 inches in length, the pectoral fins 6 feet 8 inches in length and 3 feet 7 inches in breadth, the flippers being larger than those in an adult male Sperm Whale.

The flukes of the tail are also very broad and strong.

The upper parts are glossy black in colour, with an elongated white patch extending backwards from just above the eye. The chin, throat, and belly are pure white ; this colour is carried upwards in the form of a well defined lobe which overlaps the black on the sides of the animal. Behind the great dorsal fin, which stands erect in the middle of the back, is a grey or purplish saddle mark extending across the body in the form of a crescent. The Killer ranges far through the Atlantic and Pacific Oceans, from the Arctic ice floes to those of the Antarctic.

It often visits the British coasts in summer, especially the more northern

parts about the Orkneys and Shetlands, and less frequently the English and Irish shores.

It has been known on several occasions to ascend rivers in England for some considerable distance, even as far up as Chelsea on the Thames, where three were seen in 1890. In character the Killer is fierce and rapacious, and has been likened to the wolf of the seas. They usually roam through the ocean in packs, travelling with great speed, and do not hesitate to attack large animals such as the Greenland Whale and Finner. Mr. E. W. Nelson, writing in the *National Geographical Magazine*, Washington, Nov. 1916, p. 468, says: "Unlike most whales, the members of these schools do not travel in a straggling party, but swim side by side, their movements as regularly timed as those of soldiers. A regularly spaced row of advancing long black fins swiftly cutting the undulating surface of the sea produces a singularly sinister effect.

"The evil impression is well justified, since Killers are the most savage and remorseless of whales."

In attacking their quarry, if it be one of the larger Whales, the Killers approach it on both sides, and generally endeavour to tear out the tongue when the animal opens its mouth through exhaustion.

Not only are whales and their young preyed upon by these fierce marauders, but other warm-blooded creatures, such as Seals and the young of the Walrus, also suffer.

In the Northern Pacific great harm is done to the herds of the valuable fur seal when Killers get among them during migration.

The Sperm Whale is safe from their attacks, as he is well able to defend himself with his powerful jaws.

Some authorities have considered that there are several species of the genus *Orca*, but whether this is correct is at present uncertain.

GENUS **Globicephalus.**

THE PILOT WHALE OR BLACK-FISH.

Globicephalus melas, Traill.

PLATE 48.

The Pilot Whale, Ca'ing Whale, or Black-fish as it is variously named, measures from 16 to 24 feet in length. The head is short, and characterised by a high bulging forehead. There is no beak, but the upper jaw projects slightly over the lower.

The jaws contain ten or eleven pairs of teeth in each, though the number is often less in aged animals. The line of the mouth is oblique.

The skin is very smooth and shiny, and has been compared to oiled silk.

The colour in general is bluish black, with a white line extending along the belly, which expands into a broad heart-shaped marking on the throat. The dorsal fin is low, the flippers long, narrow, and curved.

Whales the same or allied to this species are found widely distributed over the oceans of the world. They are plentiful in the North Atlantic, ranging as far north as Greenland, while in the Pacific they are abundant around the coasts of Australia and New Zealand.

In British waters it is chiefly found about the Shetlands, Orkneys, and Western Isles of Scotland, less frequently in England, where it is stranded from time to time on the coasts, a 'school' having come ashore in Mount's Bay, Cornwall, in the summer of 1911.

The Pilot Whale is very gregarious, and often to be seen in large herds containing hundreds of individuals, which appear to be under the control of

an experienced leader whom they will blindly follow even to their death. This trait in their character is taken advantage of by the Shetlanders and other islanders, who by watching the approach of a herd as it enters some sound or bay, organise great drives of the animals, and cutting them off from the sea, cause large numbers to run aground. They are then stabbed and done to death while struggling helplessly in shallow water.

This method of taking the Pilot Whale goes back for centuries, an old Danish writer of the seventeenth century having recorded about a thousand of these animals taken in two places in the Faroes in 1664.

In Quendale Bay, Shetland, fifteen hundred and forty were killed in about two hours on September 22, 1845, and many others since.

This species owes its Shetland name of 'Ca'ing' Whale or 'Driving Whale' to its habit of blindly and persistently following its leader.

It chiefly feeds on cuttlefish, but various fishes are also eaten.

The oil and flesh are of some value; according to Harvie-Brown and Buckley (*A Fauna of the Orkney Islands*) one hundred and ninety-five Pilot Whales taken near Flotta in the Orkneys were sold for £500 12s. 6d.

GENUS **Grampus.**

RISSO'S GRAMPUS.

Grampus griseus, Cuvier.

PLATE 49.

Closely related to the Pilot Whale, Risso's Grampus differs in the contour of the head which is less rounded, in the small number of teeth confined to the front part of the lower jaw, and also in possessing a high and falcated dorsal fin. The scimitar-shaped flippers are rather long, but shorter than those of the Pilot Whale.

In the *Transactions of the Zoological Society* (vol. viii. pp. 3-13), Sir William Flower has given an account of this rare species taken from a freshly killed specimen caught in a mackerel-net off the Eddystone lighthouse on February 28, 1870, with a carefully coloured drawing of the animal. By kind permission of the Publication Committee I have copied this for the figure in Plate 49, and the following notes are taken from the description :

"The most prevalent tint was grey varying in some parts to pure white and in others to deep black, but the light parts of the head and anterior portion of the body had a yellowish wash, and the dark parts a slightly bluish or purple tinge which varied much in different lights.

"The head and the whole of the body anterior to the dorsal fin was generally a lighter grey, variegated with patches of both darker and lighter hue. The eye was surrounded by a small oval patch of black. The lips were mottled with black. There was a large nearly black patch

on the top of the head, extending backwards a short distance behind the blow-hole, and on each side towards but not reaching the eye. Both surfaces of the pectoral fin were nearly black, very finely mottled or dappled with grey, and becoming darker towards the tip.

"The neighbourhood of the axilla was of the same dappled colour. . . . But what gave the most remarkable and characteristic appearance to the animal was the presence of conspicuous, but most irregular, light streaks and spots scattered over the whole of the side from the front of the head to about two feet from the end of the tail, where they ceased, at least on the lateral surface. . . . The streaks or lines were of various lengths and running in all directions in a most fantastic manner, some parallel, some crossing each other, and some forming sharp angles, zigzags and scribble-like patterns."

The total length of this specimen was 10 feet 6 inches.

Risso's Grampus has a very extensive range, occurring in the Atlantic and Pacific Oceans, and occasionally in some numbers in the Mediterranean. It is rare in British waters. In England the first known example was stranded at Puckaster, Isle of Wight, in the spring of 1843, and a few others have been taken from time to time.

In Scotland, six were captured at Hillswick, Shetland, in September 1889. Two more were stranded on the Solway in 1892 and one in the Forth near Kincardine in October 1904 (Millais). Little seems to be known of the habits of this Dolphin. Judging by the remains of cuttlefish found in captured specimens and the curious marks and scratches on the skin of the animal caused by their beaks and suckers, it appears to feed chiefly on those creatures.

GENUS **Lagenorhynchus.**

THE WHITE-SIDED DOLPHIN.

Lagenorhynchus acutus, Gray.

PLATE 49.

Two species of this genus (the Short-beaked Dolphins) characterised by their rounded heads, short beaks, and large number of vertebræ, occur occasionally in the British Islands.

The White-sided Dolphin attains a length of 6 to 8 feet when fully grown, the males being larger than the females. The dorsal fin is high and falcate, the flippers pointed and scimitar-shaped. The body is compact and stout, but much compressed where it joins the flukes of the tail.

My friend Mr. Pycraft has kindly supplied me with some notes and sketches taken from freshly killed specimens received at the British Museum of Natural History, from which, with the help of a cast of the animal in the Gallery, I have drawn the figure in the Plate and described the colour.

According to Mr. Pycraft, the "beak and upper surface of the head are dull black, edge of upper jaw (the 'tip') shading into dull greyish white towards the gape. A broad belt of black encircles the eye, and from this there runs forward a narrow black line to terminate at about the posterior one third of the rostral groove.

"Below this line, the white of the flanks and side of the head runs forward to form a narrow wedge interrupted in front of the eye

by a band of grey. Above the line and extending backwards in a rapidly widening triangle which includes the black eye patch, the skin is lead coloured. A narrow black line extending backwards to the ear and from the level of the posterior cankus, forming a conspicuous relief to the lead-coloured area."

The colour of the upper parts of the body is black, broken up by a band of white on the sides which blends into another patch of pale brownish buff extending towards the tail. The throat and belly are white with black markings surrounding the vent. The flippers are black, with a stripe of the same colour extending from their base to the corner of the mouth.

The White-sided Dolphin inhabits the North Atlantic ; ranging from as far north as Greenland to the British Islands. It is also found along the eastern shores of the United States.

Dr. Gray first described the species from a skull found in the Orkneys, and an adult female was also obtained there in May 1835. A party of about twenty were taken together in Scapa Bay, Kirkwall, on May 21, 1858. One has been recorded from Ardrishaig and another at Dunrobin stranded in April 1906.

A few have been taken in Ireland, one as late as 1916 on the coast of Mayo. Like other Dolphins, this species moves about in 'schools,' frequently leaping clear of the water as it sports among the waves along with its companions.

THE WHITE-BEAKED DOLPHIN.

Lagenorhynchus albirostris, Gray.

PLATE 50.

The White-beaked Dolphin measures from 7 to about $9\frac{1}{2}$ feet in length. The creamy-white beak is well pronounced and very distinct, in contrast to the dark frontal portion of the head. The jaws contain about twenty-six pairs of small sharp teeth in each.

The dorsal fin is large and curved.

In colour, the upper parts of the head and body are purplish black, the beak, lips, throat, and under parts creamy white.

The lips are often marked with spots of grey, and mottled patches also occur on the sides of the shoulders and on the back.

Like the White-sided Dolphin this species inhabits the North Atlantic, frequenting Davis Straits, the seas of Greenland, and across to Scandinavia and the British Islands, where examples have been stranded from time to time on the coasts. Its habits, as far as we know, do not appear to differ from those of other Dolphins.

Genus **Delphinus.**

THE COMMON DOLPHIN.

Delphinus delphis, Linnæus.

Plate 50.

In this genus, of which the Common Dolphin is the type, the elongated snout takes the form of a distinct beak. The mouth of the Common Dolphin contains from forty to sixty pairs of small sharp teeth in each jaw, the dorsal fin is large, and like the flippers, is more or less sickle-shaped in outline.

The body is long and very graceful in its lines, measuring from beak to tail from 6 to 8 feet long.

Sir William Flower thus describes its varied colouring from a specimen captured off the coast of Cornwall in March 1879 (*Transactions Zoological Society*, vol. xi. p. 2): "Instead of being simply black above and white below, as usually described, the sides were shaded, mottled, and streaked with various tints of yellow and grey. . . . The under surface was of the purest possible white."

The figure on Plate 50 has been drawn from the coloured picture of this specimen illustrating Sir William Flower's paper, by kind permission of the Publication Committee.

According to Millais, the under parts of the Common Dolphin are, in early winter, grey or greenish white.

It inhabits the temperate parts of the Atlantic, and similar or closely related forms are found in the Pacific.

THE COMMON DOLPHIN

It is common in the Bay of Biscay, and also in the Mediterranean, where it was well known to the ancient Greeks, who were fond of representing its elegant outlines on their coins.

In the British Islands it often appears off the coast of Cornwall and in the Channel, when it sometimes gets entangled in the fishermen's nets. Though rare in Scotland, it has been captured both on the eastern and western coasts and also in the Shetlands.

It is extremely sociable in its habits and may often be seen in the Mediterranean and other favourite waters, as it plays in large shoals around vessels, leaping out of the sea and showing wonderful agility and gracefulness.

The food consists of various fishes, including herrings and mackerel; cuttlefish and crustaceans are also eaten.

The mother Dolphin shows great affection for her single young one, which is carefully nursed and tended.

The flesh was at one time much sought after as an article of food, especially in France, and like the meat of other cetaceans was looked upon as fish and allowed to be eaten on fast days.

GENUS **Tursiops.**

THE BOTTLE-NOSED DOLPHIN.

Tursiops tursio, Fabricius.

PLATE 50.

Apart from colour and size, the chief external difference between this species and its near relation the Common Dolphin, lies in the shape of the beak, which in the Bottle-nosed Dolphin is short and depressed and has the lower jaw slightly longer than the upper. It has also fewer teeth, possessing only from twenty to twenty-five pairs in each jaw.

The total length of the animal is from 8 to 10 feet.

The colour of the upper part of the head and body, including the fins and tail, is a glossy purplish or greyish black, the margin of the upper lip to the point of the beak, greyish white, the lower jaw, throat and belly, white. In some individuals the colour of the under parts is dark grey marked with patches of white.

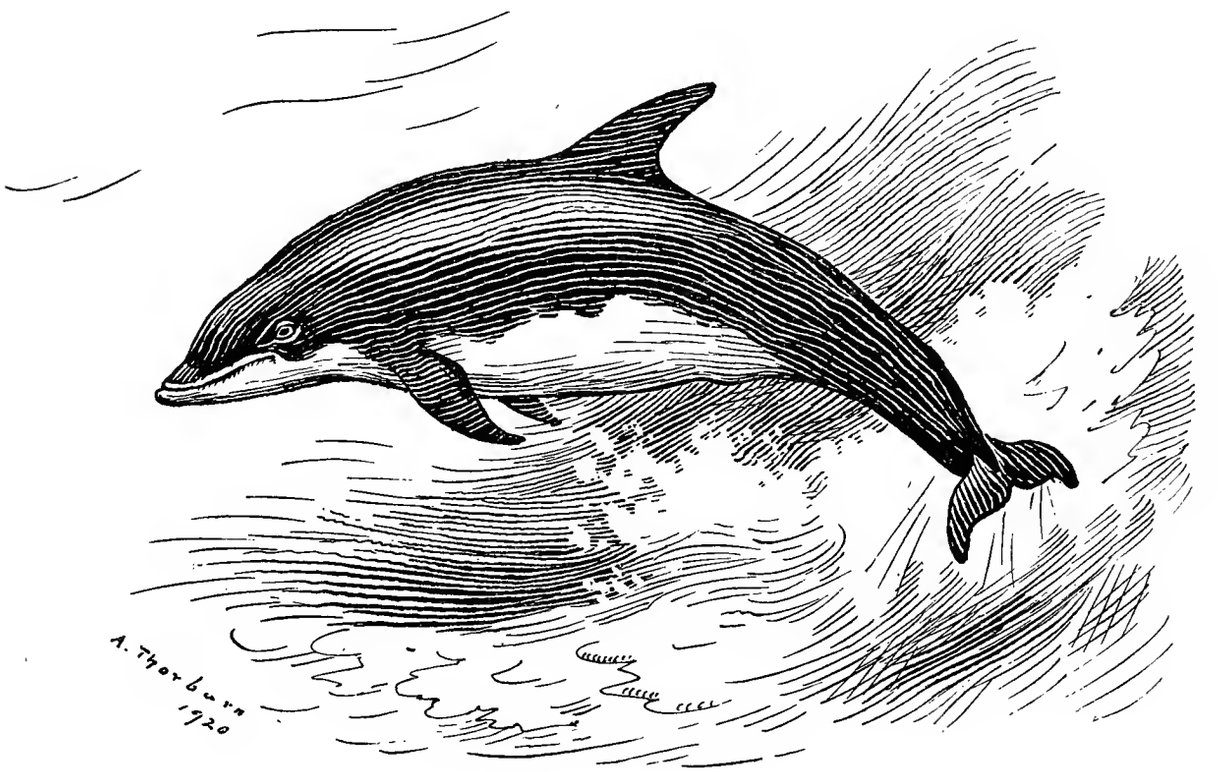
This Dolphin is not uncommon off the coasts on either side of the Atlantic, in America ranging as far south as the Gulf of Mexico, and in Europe occurring in the North Sea, Bay of Biscay, and Mediterranean (Millais). A good many have been captured on the English coasts, the first recorded having been a female taken along with a sucker near Berkeley, and described by John Hunter in 1787.

Its occurrence in Northern Britain seems to be less frequent, though it appears from time to time along the Scottish shores. In October 1901 a party of six were stranded at Inverness.

THE BOTTLE-NOSED DOLPHIN

It has seldom been recorded in Ireland.

There is no evidence to show that it differs much from the Common Dolphin in its actions or habits.



MAMMALS EXTINCT IN THE BRITISH ISLANDS WITHIN HISTORIC TIMES

There are five interesting wild animals which have become extinct in our islands within historic times, namely, the Wolf, the Brown Bear, the Beaver, the Reindeer, and the Wild Boar.

THE WOLF.

Canis lupus, Linnæus.

This species was once so numerous as to be a scourge in many parts of the land, and appears to have survived to a later period than any of the others on the list. The many place-names referring to the presence of the animal in widely separated localities show how prevalent it was in past days, and how great an impression it made on the imagination of the people in their homes when the Wolf had literally to be kept from the door, and when places of refuge had to be constructed to shelter travellers among lonely moors and forests.

In England, where it is said to have lingered till about the beginning of the sixteenth century, it had disappeared long before the last were killed in Scotland and Ireland.

In Scotland the great uncleared forests of the Highlands harboured the Wolf until much later, so that it survived there to a comparatively recent date, the last being probably the "four old ones and some whelps"

referred to by Mr. Harting (*Extinct British Animals*) as having been killed in Sutherland between 1690 and 1700.

In the Reay country as well as in other parts of Scotland the ravages of the wolves were at one time so terrible as to force the inhabitants to bury their dead on islands such as Handa and others.

In Ireland the Wolf appears to have survived till about 1766 or 1770.

THE BROWN BEAR.

Ursos arctos, Linnæus.

The references made by ancient writers relating to the presence of the Bear in Great Britain during the Roman occupation of the country show that it was not uncommon in byegone days when animals from the Caledonian forests were transported to Rome to play their part in the arena.

The Bear appears to have existed in Britain well into Saxon times, but the date of its extinction is uncertain. Later when Bear-baiting became a popular amusement, large numbers of the animals were brought from the Continent of Europe for the purpose.

THE BEAVER.

Castor fiber, Linnæus.

The remains of this species found in various parts of England, Wales and Scotland show that it existed in some numbers, though there is nothing to indicate that it ever inhabited Ireland.

There is some allusion made to this animal in ancient laws, chiefly relating to its valuable fur.

According to Welsh historians, the Beaver was once not uncommon in their rivers, where Pennant says it remained till late in the twelfth century.

THE REINDEER.

Rangifer tarandus, Linnæus.

The number of horns of the Reindeer found in marl and peat deposits prove the abundance of this species in the British Islands in pre-historic times, and for long afterwards it lingered in Caithness and the Orkneys.

From a passage in the *Orkneyinga Saga*, it appears to have been regularly hunted in the mountains of Caithness by the jarls of Orkney, who in summer crossed to the mainland for this purpose (Harting).

There is a good figure of the animal incised in an ancient monumental stone near Grantown.

THE WILD BOAR.

Sus scrofa, Linnæus.

The Wild Boar was a common beast of the forest inhabiting Britain in early times, and is frequently mentioned in the laws and in books on hunting of those days.

It is said to have been still plentiful in the reign of Henry VIII., though when it actually became extinct in England is uncertain.

Like the Wolf, the Wild Boar has left traces of his presence in the names of many places in the British Islands, showing how common he must have been at one time.

APPENDIX

ADDITIONAL NOTE.

THE WALRUS.—As exception has been taken to the inclusion of this species as a British Mammal, it may be interesting to note that Mr. Henry Jamieson, Keeper of the Skerries Lighthouse, Shetland, reports the occurrence of a Walrus which haunted the neighbourhood of the islands from July till October 1920, as recorded in the *Scottish Naturalist* (Nos. 107-108, 1920).

The animal was first observed early in July by the boatman and his son while lifting a fishing line inshore at the entrance of Angry Sound, when it followed the boat for some distance, about fifty yards astern.

It was subsequently seen at various times, the last being on October 13th, when it was observed by Mr. Jamieson.

The tusks in this example were estimated at from 12 to 15 inches long.

According to Mr. Jamieson, Walruses have been seen in the same neighbourhood twice previously during the last fifty years.

THE END.

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